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Approach

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THE NAVAL AVIATION SAFETY REVIEW

In This Issue

Approach

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IN THIS ISSUE

More than meets the eye—Maybe you've had occasion to notice that there can be a surprising difference in performance between two peas-in-the-pod alike airplanes? If so, then you'll be interested in learning about certain shrewd maintenance practices suggested by powerplant and airframe engineers to make your little jewel sparkle with performance. Read and profit from the tips contained in "Why Aircraft Differ."

COVER PHOTO . . . *Courtesy of North American Aviation, Inc.*

Don't let that title fool you—the subject of this latest "Primer for Pilots" does *not* deal with physical repose and relaxation. Matter of fact, we hope to agitate you into some serious thought about a very important thing called stability.

After reading our version of the "Rime of the Ancient Mariner," almost anyone who struggled through English II will admit that poet S. T. Coleridge was a pretty fair accident investigator. His poem, we think, lends itself admirably to the sad account of another *Mariner.*

This periodical contains the most accurate information currently available on the subject of aviation accident prevention. Contents should not be construed as regulations, orders or directives unless so stated. Material extracted from Aircraft Accident Reports, OpNav Form 3750–1 and Anymouse (anonymous) Reports may not be construed as incriminating under Art. 31, UCMJ. Names used in accident stories are fictitious unless stated otherwise. Photo Credit: Official Navy or as credited. Original articles may be reprinted with permission. Contributions are welcome as are comments and criticisms. Address correspondence to Director, U. S. Naval Aviation Safety Center, NAS Norfolk 11, Va.

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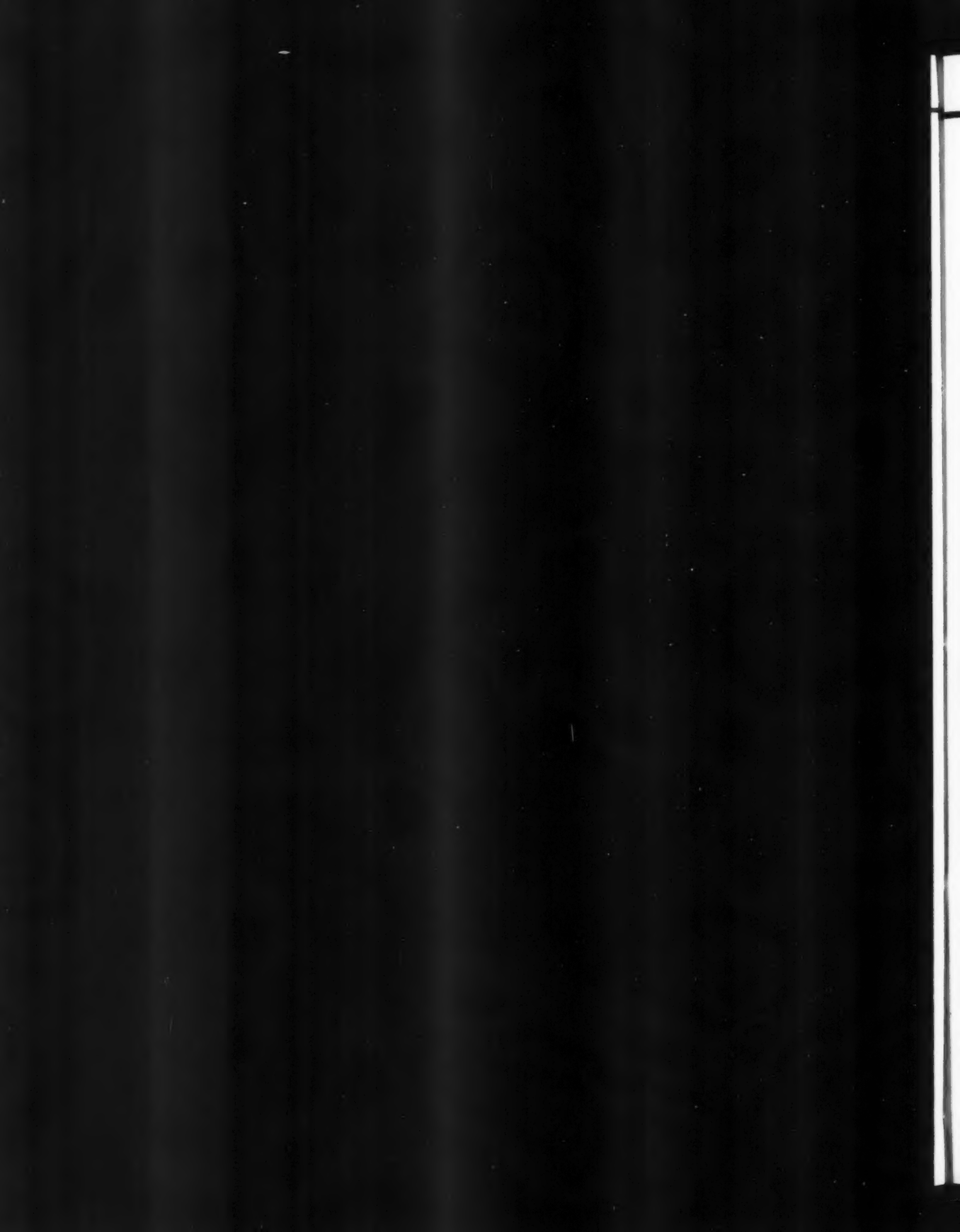


Letters to the Editor

Sir:

. . . request permission to reprint The Case of Lcdr. Ziltz, September *Approach*. I will transfer Ziltz to an AF uniform and organization. Same situation. Same aircraft. Same results. As all of us in military aviation seem to have the same general problems, I feel this article will be of great value to us. . . .

JAMES T. BUTCHER
Capt., USAF, Wg Fly Saf Off, 314th Troop Carrier Wing (M)

Lcdr. Ziltz looks forward to an exchange tour with the Air Force.—Ed.

Sir:

. . . your article, July *Approach*, p. 38 on gun bay doors . . . "Pilots and maintenance men are responsible for proper preflighting of aircraft." . . . this appears to be out 180 degrees from NavAer 00-25-500, sec. 3, para 4-302 . . . p. 21 and 22.

BOOT ENSIGN

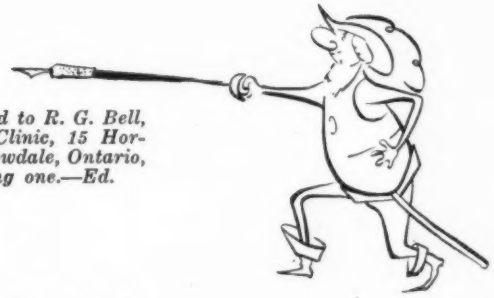
Sorry, Boot, the nitpicker's award goes elsewhere this month. You misquoted Approach: *"pilots and maintenance men* share the responsibility . . ." *—Ed.*

Sir:

Shay, where the heck can I get one of dem dere "alcordials" —you know, the one in September *Approach?*

ELBOW BENDER

The "Alcodial" is a private and copyrighted venture of a couple of fine Canadian gents who run a cure palace. They graciously consented for Approach *to use the dial as an illustration, gratis. If you'd like a personal Alcodial we hear that a buck forwarded to R. G. Bell, M.D., the Bell Clinic, 15 Horsham Ave., Willowdale, Ontario, Canada will bring one.—Ed.*



Sir:

Many different types of flashlights have been and are still being used by aviators on night flights. None of them has ever completely satisfied the user. Recently the "Red Rippers" adopted the flashlight manufactured under the Boy Scouts of America label as the most suitable under most conditions; the new types are waterproof, also, or so advertised. The greatest advantage of this light is the 90-degree beam deflection, plus its spring clip on one side. When the interior or cockpit lights fail, this flashlight can be clipped to the parachute or shoulder harness, thus illuminating the instrument panel yet leaving the pilot's hands free for other cockpit duties. It eliminates light stowage under armpits and crotches, or in mouths (which is tough on teeth). Incidentally, the clear red and diffuser white lenses from current Navy issue lights fit the BSA light perfectly.

Why this simple BSA flashlight couldn't be manufactured as a standard issue item for flight crews is a question we present to you as the best bet for fast action.

E. K. TRZCINSKI, LT, USN
Safety Officer
Fighter Squadron ELEVEN

All may now "Be Prepared," thanks to your Gold Arrow suggestion.—Ed.

Sir:

Lines composed in the groove during CarQuals on a very black night:

One for the money
Two for the show
Three to get ready
And vertigo.

D. W. KENNEDY,
LCDR, USN, VAH-11

Let's have more.—Ed.

Sir:

. . . You may be interested in knowing BuAer has presented Mr. Carl F. Dreesen the Meritorious Civilian Service Award, with "superior accomplishment" for his contribution to the improvement in the efficiency of government operations. . . .

JUANITA F. O'DONNELL
Executive Secretary
BuAer Incentive Awards Committee

Readers may recall "The Burning Question," June Approach, *which was inspired by Mr. Dreesen's Navy Aircraft Fire Fighting and Rescue Manual. Other military departments, commercial airports and aircraft industries are now making use of his pattern.—Ed.*

Sir:

. . . while pondering the wheels-up landing problem, I composed a slogan which other units might find beneficial. We have posted it in our readyroom and each flight departing gets a glance at it going out the door—So far no such accidents have occurred in this squadron.

A Safety Officer's Prayer

Before he lands, He will,
Put his Wheels down
slow down,
Put his Wheels down
Lock his safety belt,
Put his Wheels down
Flaps down,
Put his Wheels down
100% Oxygen,
Put his Wheels down
Speed Brakes up,
Put his Wheels down.
Amen

VA Safety Officer

More on next page

Letters to the Editor

Continued

Sir:

In line with previous discussions on the compromise between safety and operational effectiveness, I have taken the liberty of collecting a few details on VF-112's safety record in that they captured all team honors at the Naval Air Weapons Meet at El Centro this summer.

I believe the most significant fact is that they had an accident-free record for 13 months which covered the tail end of a deployment in F9F-6's, transition to F9F-8's, squadron reforming, and training cycle which included 10 weeks of high pressure training at El Centro. During the training cycle the average pilot time was 265 hours per pilot and a total of 20 "E" in weapons was earned by the squadron.

Unfortunately, following this 13-month period, three accidents occurred. Of these, one was a minor accident involving patching wing skin following a collision with the tow bar. The other two accidents were major, one of which was pilot error. In that accident, the pilot retracted his wheels too early on takeoff. . . . The second major accident was a material failure in the main landing gear during the rehearsal of the TV show "Wide Wide World."

I feel that the critical period of aircraft checkout has been very well covered by this squadron as evidenced by accident-free record, not only in checkout of the squadron pilots, but in checkout of all comers from the air group, ComAirPac, BAR El Segundo, and Pt. Mugu.

Although this is not a perfect safety record and over a period of 16 or 17 months the safety record was only that which was average for overall Navy, I feel that analysis of the record by parts, including the 13-month accident-free period and the specific type of accidents which occurred following that period, is worthy of some comment. Every opportunity should be exploited to publicize those organizations which have proven effective combat readiness and at the same time maintained a good safety record.

A. W. BRIGHT
Acting Director, Aviation
Safety Div. Op - 57

Amen!—Ed.

Sir:

The letter from Captain Swartz, USN (July '56), and the editorial comments pertaining to Plane Captains, were of particular interest.

In too many squadrons the duties of the Plane Captain are very limited. Oftentimes to the extent of merely removing or replacing chocks and tiedowns and refueling after a flight.

The VA-86 approach to this problem is in the right direction, however the idea of each squadron preparing a Plane Captain's Handbook seems to be a confusing method.

The Bureau of Aeronautics has prepared handbooks for pilots and maintenance and repair men for each type of aircraft in the Navy system. To complete the series a pocket-sized Plane Captain's Handbook should be prepared at the same time. The book to be issued to each Plane Captain.

The first section of the handbook should cover the duties of the Plane Captain with general information on line maintenance and use of line maintenance equipment. Line safety precautions should also be stressed.

The second section would cover carrier operations as applicable.

The main section of the handbook should deal with information on the specific type of aircraft, which is necessary to proper line maintenance. All work which the Plane Captain should be capable of performing to be thoroughly covered.

A handbook of this type will tend to standardize and improve line maintenance, distribute the work load more equally among maintenance personnel, and provide better qualified Plane Captains.

The net result would be a more uniform system of line maintenance throughout the Navy and Marine Corps, higher availability, safer aircraft, and fewer accidents.

SAMUEL A. MESSER
MSgt USMC
Aviation Safety Office
1st Marine Aircraft Wing

Your recommendations concurred in, and forwarded to BuAer—Ed.

Sir:

We have read with interest the simulator story in the July, 1956 issue of *Approach* and with your permission would like to have the article reprinted . . . We contemplate using the reprint as a handout at the National Aircraft Show in Oklahoma City this September . . .

JOHN T. SWIFT
Public Relations Department
Link Aviation, Inc.
New York

Permission granted —Ed.

Sir:

Your September *Approach* contains an article concerning the Safe Flight Precision Pre-Stall Warning Instrumentation that is to be installed in a number of AD aircraft. Our company has participated in this program from the start and . . . would appreciate receiving copies of this particular issue.

With the advent of including our Speed Control Indicator on the Martin P5Ms, you may be desirous of presenting information on this new instrumentation . . . our company will assist and contribute in every possible way.

K. R. DUEE, JR.,
Safe Flight Instrument
Corp, White Plains, N.Y.

Copies of Approach, *with "Give the Stick Shaker a Fair Shake," are on the way. We'll take you up on that assistance for the P-boaters.—Ed.*

Letters may be forwarded either via official channels or direct on Anymouse forms. All letters should be signed, names are withheld on request. Address Approach Editor, U. S. Naval Aviation Safety Center, NAS Norfolk 11, Virginia.

DID you ever get the feeling, as the rest of your flight disappears over the horizon, that you were at the controls of what the trade calls a "clunker?"

Or maybe you've encountered that sinking feeling off the bow when your faithful steed appeared to be considering an early disability retirement.

Understandably, such experiences can give rise to a suspicion that some airplanes fly better than others—and if you don't think so, just try flying the "Old Man's" airplane sometime.

WHY AIRCRAFT *Differ*

The following discussion, based on material supplied by North American Aviation Inc., and Pratt & Whitney Aircraft Engines Inc., should give you an insight as to "Why?"

Pilots flying today's high-performance, low-drag supersonic airplanes will notice performance differences more and

Please turn page

WHY AIRCRAFT *Differ*

Continued

more frequently. These differences also exist in lower-speed airplanes, but the effect upon performance is more subtle and might not be noticed by some pilots.

The low drag characteristics of a supersonic airplane afford an opportunity for small changes in drag. These may be due to surface roughness, deposits of mud, dirt and grasshopper or bug juice, dented surfaces, poor alignment or rigging of control surfaces, cabin air seal leaks, sprung landing gear doors, provisions for external stores. The gross weight of the airplane may also add to appreciable differences in airplane performance and in variations of the thrust required from the engine. In laminar flow wings, the leading one-fourth of the airfoil especially must be kept clean and waxed to prevent early separation drag rises.

Even with close manufacturing tolerances, no two new airplanes or engines are exactly alike. Normal wear and tear of service cause changes to creep into the airframe and engine.

For example, a pilot may be flying full bore at 35,000 feet. His wingman finds that in order to keep his position, he must throttle back considerably. In the postflight bull session, the wingman concludes that he has a hot airplane, while the lead pilot is not so happy with his airplane.

Who is correct? Possibly neither. Pilots must learn that there are valid reasons for normal airplanes to differ considerably in performance. While proper maintenance and adjustment will keep these differences to a minimum, they will nevertheless still exist. Some of the reasons are as follows:

RPM and Thrust

Despite high-precision manufacturing methods, it is impractical to manufacture fuel controls which can consistently schedule engine RPM to closer than ½ or 1%.

In the high thrust range, 1% rpm can account for approximately 5% to 7% of maximum thrust. This means that in two airplanes, one of which is operating to +½% of the nominal RPM schedule, and the other to ½% of the schedule, the plus airplane may have up to 5% more thrust.

In the supersonic range where airplanes are over the hump of the drag curve, these thrust differences account for significant performance differences.

Also, cockpit tachometer accuracy is rarely better than 1% of full scale, so that the RPM may actually be greater or less than the indicated reading.

Operating conditions themselves never remain identical as minor or minute variations are continually occurring.

Name plate ratings (RPM) for equal thrust vary among engines, and engine thrusts will vary from their own posted ratings.

Inlet Air Temperature

One of the signals used by the fuel control unit of newer turbo-jet engines to schedule the proper amount of fuel to the burners is the temperature of the engine inlet air, sensed by a device which translates temperature into mechanical displacement of levers within the fuel control. Although manufactured to close tolerance, differences can exist between two seemingly identical installations. Tests have shown that *accumulation of tolerances* in the temperature sensor and within the

fuel control are such that perfect repeatability under all conditions cannot be achieved. All these factors will account for thrust differences in normal airplanes.

Another reason for thrust differences among engines equipped with afterburners is the allowable tolerances in afterburner fuel metering flows. Other things being equal, the meter providing the greater amount of fuel will produce more thrust. The metering tolerances are held as close as practicable, but differences can exist which will affect performance.

In afterburner power, even slight differences in nozzle exit areas will affect thrust output. Such differences are inherent among airplanes, and are accentuated should the nozzle fail to open completely.

Engine Condition and Trim

As axial flow jet engines accumulate operating time, the compressor blades collect slight but significant deposits of dust and dirt, smog or soot from other engines, grasshopper and bug juice, as well as roughness and nicks from sand and gravel or other small foreign object damage. These accumulations impair the efficiency of the compressor, and the engine must be retrimmed in order to restore thrust to the proper value.

Eventually a point is reached where trim can no longer be restored without exceeding RPM limits. In such cases, carbo-blasting the engine will usually restore the compressor to almost normal efficiency. The frequency of carbo-blasting will vary depending upon the degree of fluid leakage into the engine and upon operating conditions. Under unusual circumstances an engine may require it after an operating time of only 25 hours; more reasonable expectations are 150 to 300 hours.

Engine power output is also affected by the nonlinearity of engine trim curves. In general, engines trimmed on hot days (above 60°F.) will produce more thrust than engines trimmed on cold days.

The Fuel Flowmeter

Discussions of the foregoing topics have prompted several pilots to suggest that the fuel flowmeter might serve as an instrument of the "least common denominator" by which monitoring of engine-airplane performance might be achieved.

Use of the fuel flowmeter for this purpose is *not* satisfactory. Fuel flow is dependent upon, among other variables, engine inlet air total temperature. On a 32°F. day, the fuel control will schedule approximately 35 percent more fuel to the engine than on a 100°F. hot day.

And even if the pilot had a total temperature gage in the cockpit, the computation required to translate observed fuel flow to corrected fuel flow under standard conditions would be impractical. In addition, the fuel flowmeter itself is less accurate than many of the other instruments in the airplane.

Airplane Trim

At high speeds, minor differences in airplane trim can have a profound effect upon airplane drag characteristics and account for performance differences. Care should be taken to see that the individual airplane control surfaces are properly rigged.

While efforts are being made to reduce differences to a minimum, thrust and performance differences will exist among seemingly identical airplanes, and pilots must learn to live with such differences, especially when missions involve several airplanes. ●

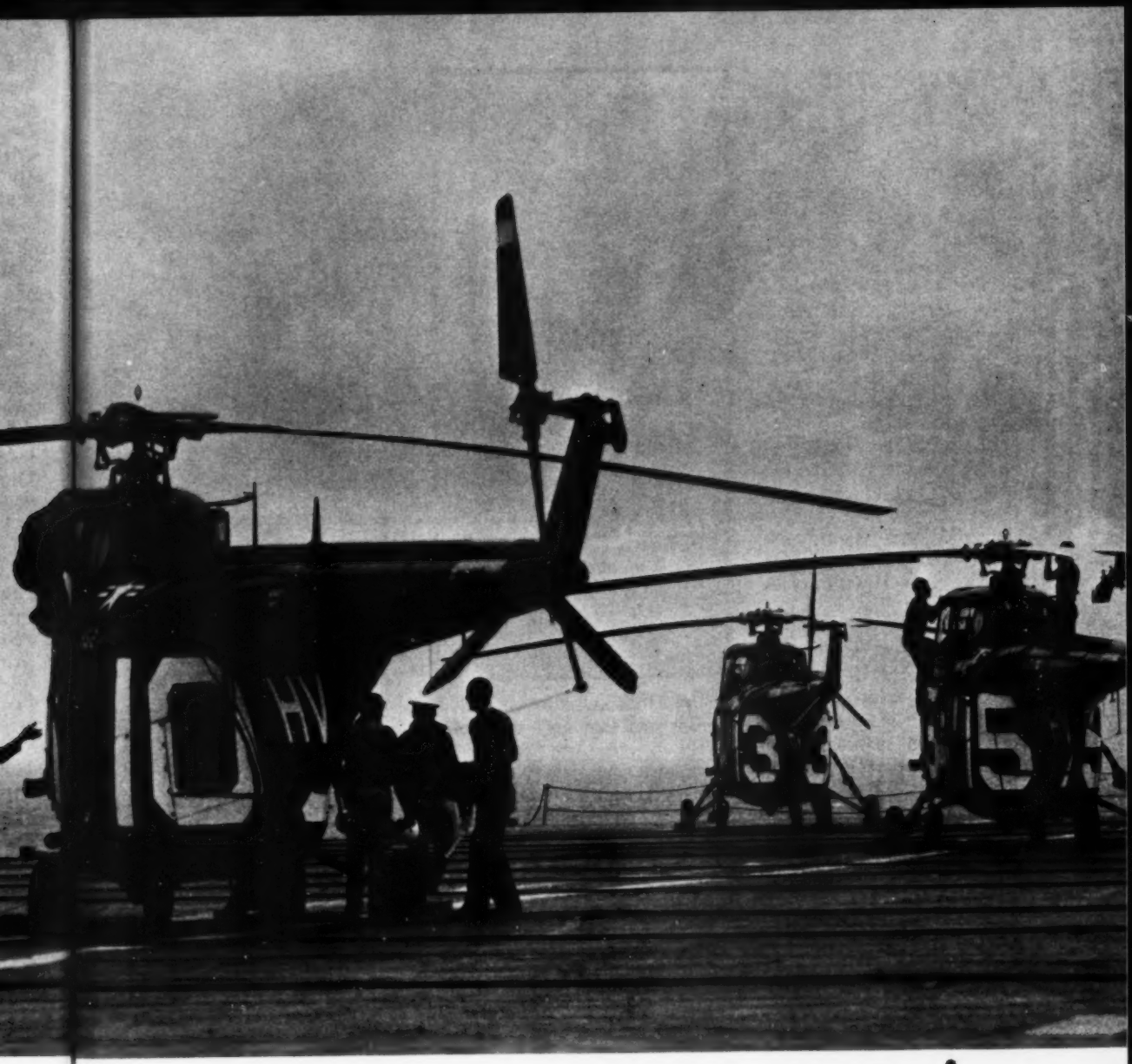
BEATIN' THE EGGBEATER

By
Major Donald H. Foss, USMC
MAG(HR) -36 Safety Officer

THERE are many hazards to helicopter flying. When flying close to the ground, the helicopter pilot must be ever conscious and especially alert for the unusual obstacles that one encounters when the altimeter rarely exceeds 500 feet above the terrain. The following hazards are not intended to encompass all the dangers inherent to helicopter flying, but they touch on those subjects which are considered very hazardous to all pilots.

How many times have all of us been told to keep our eyes open? By mother when we crossed the street, by every teacher when we sat in class with that "3000-mile stare with the 6-inch focus," by each instructor in flight training, by every safety officer in every squadron, and right now. Keep 'em open . . . eyes were meant to be closed only when in a horizontal position . . . It's just a law of gravity. Close your eyes sometime when you're flying, and you'll end up just that way—horizontal . . . The average helicopter has five eyes. Two each for the pilot and copilot, and one for the man-in-the-hole who can only see one side at a time. Use 'em all.

Powerlines seem to be a favorite target for all pilots of the whirlybirds. A one-inch powerline makes a first class slingshot. But helicopters weren't meant to be fired from a weapon. Particularly not backwards. And if anyone knows a valley



BEATIN' THE EGGBEATER

Continued

where there aren't any powerlines, keep it a well-guarded secret within the organization. The only logical reason why there aren't any powerlines there, is that the power companies don't know that valley exists. Radio stations with antennas extending 1000 feet or more have much the same effect as powerlines when they come in contact with an errant eggbeater. Stay away from them!

Birds, too, are killers. And the bigger the bird, the bigger the hazard. And the bigger hole he makes when he hits your plane. In WW II, the Department of the Interior actually made charts of the flight paths of the migratory birds, to help airmen avoid them. But the birds with which we are concerned have no particular pattern. Not one of them has a pilot's license, or ever took an exam on CAR. They're like drunken drivers on a crowded highway. Don't play chicken with them. Every once in a while you'll find one that didn't chicken out.

Everyone talks about wind. Don't engage in a gusty wind, don't engage with your tail into the wind, keep your engine running until the droop stops are in . . . but how about after you clear those gusty winds on the deck? At an altitude of 500 feet, the wind hasn't changed much, ordinarily. It's still dangerous. Ever try flying on the leeward side of a hill on a gusty day? Some have done it—once . . . and lived. But you can rest assured that an oath was taken on the spot that once was definitely enough. And the "collective under the armpit" craze on a gusty day is like playing Russion roulette with a .45. You can't win. Ask someone who has experienced blade stall. It takes quite a while to swallow your insides again.

Major Don Foss, author of this interesting summary of helicopter flying hazards, graduated from Navy flight training in 1944, and became a helicopter pilot in 1951. His subsequent experience with the hazards peculiar to chopper flying includes some ringside time with those Korean hills. Following his graduation this year from the Navy's Aviation Safety Officer's School at USC, he was named MAG(HR) -36 Safety Officer.

A word about the kind of day you "choose" for your flying. A clear sunny day may seem an ideal time to go out and have a ball. But there are a few things to remember even then. All of us remember a few things about night vision. When someone shines a bright light in our eyes, we can't see a thing for a while. The sun will do the same thing to you in the daytime. Don't ever look straight at the sun. And if you must fly directly into the sun, try and keep it behind one of the posts in the cockpit. And, even then, wires, birds, planes, and other traps are just that much harder to see when you are looking into the sun.

And what about the days when there isn't any sun. Relax. You don't have to worry about the sun any more. All you have to do is worry about the haze, fog, smoke and the fact that the other guy can't see a thing, either. If you're flying low enough to see the outlines of road signs, and most helicopters do, it's a good idea to remember one of them in particular. "Slow down and live!" The manufacturer didn't make these "agitated palm trees" to crack the sonar barrier. And people didn't take helicopters into account when they laid out their aerials, powerlines, coconut groves and housing tracts. It's up to us to stay away from them.

No one likes to take a bath with their clothes on. But a helicopter isn't too particular where it ceases to function like a normal helicopter (if there is such a thing as a "normal" helicopter) and proceeds to make like a rock. The important thing is what to do when it decides to quit. Probably the most important thing to do in water landing is the briefing of the crew and all passengers *before* takeoff. The accepted position for all passengers "in the hole" is, slightly bent forward with their hands on their knees. And to *stay* strapped in until the aircraft decides which way to go. Wait 'til it stops!

As for the position of the door, it's not an open-and-shut

Helicopter pilots need to be especially alert for the unusual obstacles encountered during low altitude flying.

case. There are advantages both ways. But, either way, if someone has to unstrap himself to change the position of the door, *don't*. In all records of ditchings, no one has ever reported any trouble with the emergency exits.

The recommended procedure for a pilot is, *think!* There isn't too much time for debate when flying at low altitude. And, if you've got a little power left, try it that way. If you can hover, let your passengers get out first, then go a little ways downwind, and drop it in. When the plane hits the water, try and roll it to the side opposite the door. This, in an HRS/HO4S is a little difficult to do at times. At the same time you try to roll, depress the collective. This will give the blades more of a tendency to "dig in" and not to skip over to the other side and hit you or the passengers trying to clear the plane. It'll also make it easier to clear the aircraft, if you don't have to fight the collective on the way out.

As I've said, this is all very good, in theory. But helicopters aren't theorists. The HRS/HO4S wants to roll to the right in most cases, and, in most cases, it wins. In the majority of all HRS/HO4S ditchings, the plane has rolled to the right, and ended up in the down-side up position.

And don't ever take on bets on how long your wounded gooney-bird will stay afloat. You'll lose. The HRS/HO4S has stayed up as long as 10 minutes, and has gone down in as little as 4 seconds. So, the word on helicopter ditchings might be summed up as follows: "Know before you go, and when you got to go, git!!"

Every day, in naval aviation, enough money is lost in accidents to keep all the naval aviators supplied with new cars, and gas to run them. Wouldn't it be nice if such a policy existed? Would you avoid an accident to get a new car? The only trouble is, whenever there's an accident, too many times, someone isn't around to claim his new car. And you can't drive your new car in heaven, h--- or the hospital. . .●

ANYMOUSE and

'. . . . . JUST LIKE THE BOOK SAYS!'

Sir:

The enclosed letter was left on my desk by one of our graduating students. Flameouts are a common thing in jet aviation. . . . However, this one was worth mentioning because it happened to a new student, over an overcast, on a maximum endurance flight.

JTTU gained a friend . . . for insisting that he know all common emergencies and the proper method of handling same. His first impulse was to eject as soon as he hit the overcast but decided to give his training a try. It paid off.

JAMES B. CAIN, CDR
Officer-in-Charge, JTTU
Olathe, Kansas

"Three of us, an instructor and two students, were returning from a nav hop. We were letting down from 40,000 when at 35,000 the following happened:

"My engine flamed out and I immediately froze with fright, wondering what I do now. As I gulped my heart back down I called my instructor and told him what happened. He told me to take things easy, and then I lost radio contact.

"The next sequence of events was just as if the ground instructor was telling me what to do and I was doing the 15th restart in the operational flight trainer.

"At 25,000 feet I went through the steps drilled into us. Throttle off—whoops, didn't have throttle off, only in idle. Now throttle off, recycle . . .

. . . "No start at 24,000 so let's try emergency battery switch to battery and do it again. . . . Relax boy she started. . . . Call the instructor . . . laugh boy, she's off and running . . . easy on the throttle, you're on emergency fuel.

"Instructor says to duck through the overcast . . . a hole over to the left. . . . Okay, got it made. . . . Still in battery so will switch to BAT-GEN—S—of a ——, she quit again!

"Of course, you dope. . . . Went through the battery OFF position too slow. . . . Got to move that switch *fast* or you'll lose it. . . . All right now, calm down. . . . The instructor's with you and you still have 20,000 feet.

"Try again same way. . . . Relax, she's lit again. Leave her in emergency, leave her in battery and let's go home.

"Nothing to it as I sit here writing this, but actually I was one scared boy and my point is this: I made several mistakes during the restart attempts but mistakes notwithstanding, the emergency lectures and the many operational flight trainer drills almost automatically took over and allowed me to do enough things right to get a restart."

Thanks,
Anymouse

his hairy tales

Anymouse reports are submitted by Naval and Marine Corps aviation personnel who have had hairy or unsafe flight experiences. As the name indicates these reports need not be signed. The purpose of Anymouse Reports is to help prevent or overcome dangerous situations. Forms for writing Anymouse Reports are available in ready rooms and line shacks. All reports are considered for appropriate action. Send reports to the Naval Aviation Safety Center, NAS, Norfolk 11, Va.

SURPRISE

"A *Viscount* looks mighty big from the cockpit of an S2F. Especially when passing 100 feet overhead on a head-on course with a closure rate of over 500 knots.

"It happened on a sunny day on top of an overcast with visibility unlimited. We were proceeding north on Victor 16 with an IFR clearance to maintain 11,000 feet.

"Approaching a busy intersection both of us in the S2F momentarily had our heads in the cockpit for some reason and when I again looked up I found myself staring very briefly into the shocked eyes of a *Viscount* pilot going the other way. He passed not more than 100 feet over us and neither aircraft had time to make any evasive maneuvers.

"I'm sure this wouldn't have happened if one or both aircraft had been keeping a constant lookout. I write this to emphasize the need for a constant visual scan in these days of high speed aircraft, regardless of the type clearances."

Thanks, Anymouse, for helping us remind all hands that when you're flying VFR on an IFR clearance, ATC cannot provide separation from other VFR traffic.—Headmouse.

LOVER BOY

"Everything was normal during the first few landings of a fam stage landing practice in an S2F. Since my previous landings had been good, all my attention was not concentrated on what was going on —maybe the fact that I had just become engaged had something to do with it.

"The next pass was a single engine. The first in three weeks and the procedures weren't firmly imprinted. The whole approach was spent in trying to remember the finer details and I didn't remember the more obvious—like putting the wheels down.

"Although the prop and wheel handles are only four inches apart, and I checked the prop four times, the wheels never entered my mind, at least until the waveoff.

"Moral: Be thoroughly briefed, know what to do and keep your mind on your flying. Also, wait until you are out of the training command to get engaged."

BENDS

It was cold and clear at 40,000 feet and Anymouse had been at this altitude for 40 minutes when his right leg picked up a slight cramp. He took his knee pad off, thinking it might be affecting the circulation, and tried to move his leg to help the cramp. However, the condition didn't improve.

"My left leg and hip started to ache," said Anymouse, "followed quickly by pains in my arms and shoulders. At this time I realized I must have the "bends."

"I went to 100 percent oxygen and checked my cabin pressure which was reading 35,000 feet. I immediately called for an on top clearance and went down. At 25,000 feet the pain was relieved and I leveled off.

"Feeling very nervous and jumpy I decided to land at the nearest field. From the time I first felt the pain until I landed was about 20 minutes. After landing, my legs and arms felt very nervous and jerky and I had a generally exhausted feeling in them.

"Never having experienced bends before I made the first mistake in thinking I had nothing more than a cramp.

"A slow leak was discovered in my pressurization system and from now on the cabin pressurization gages are now included in my regular engine instrument checks."

DISORIENTATION

Over their destination after a night cross-country, Anymouse and his wingman began a letdown. They entered an overcast at 8000 feet and encountered rain and lightning. Anymouse told his wingman, who was low on fuel, to descend first and continue independently.

Below the cloud deck both pilots were disoriented and the wingman reported orbiting over a small lighted civilian field. Requests for emergency UHF/DF steers were answered and field personnel also began blinking the runway lights and a rotating red beacon for identification. As a result of the steers the wingman was brought into the air station where he landed. Only 50 pounds of fuel remained when he reached the gas pits.

Anymouse looked at his own fuel gages with shock as he was down to 500 pounds. He declared an emergency, requested steers, and headed east toward two lighted areas. Sighting flares, Anymouse was told they were from ADs north of the field. At that point Anymouse declared he knew where the field was and completed his approach and landing.

ANYMOUSE

(Continued)

"It was hard to identify the field from over a few miles," said Anymouse, "in spite of the blinking runway lights or red lights. This particular night the field had 13 emergencies due to disorientation from rain showers in the area. The flares from the ADs were visible for probably 30 miles. Wouldn't it be possible to use a similar type of illumination over an air station in such weather?"

AFTERTHOUGHT

"I took off from an air station in an AD-5N and proceeded to the target area on a routine rocket and bombing hop. After completing three rocket runs I commenced my fourth run from 6000 feet. Right after I called pushing over, a large object went flying by me and lodged in the right front seat. At the same time there was a blast and a heavy blanket of cold white fog covered the right side of my helmet and face.

"Finding I still had control of the plane I pulled out and recovered. The object which had climbed into the right front seat was a 50-pound CO_2 fire bottle and when it hit the front of the right cockpit the trigger depressed momentarily.

"I was lucky that the bottle went into the right seat. Primary damage was limited to my UHF radio. However, my initial mistake was not including the rear compartment on my preflight inspection. The CO_2 bottle was in the plane due to earlier preparations for a hurricane evacuation. The bottle was loaded aboard as gear necessary for supporting the squadron while at the evacuation field.

"A closer inspection of the after compartment is a necessary part of all preflight inspections, and I am going to be sure and include this every time."

'A REPORT IN TIME . . .'

Re: September *Approach*, "Illusion Confusion."

"While I was stationed at NAS Alameda as a control tower operator the carrier dock there has, twice to my knowledge, been confused as a runway.

"The light pattern formed by the white dock lights outline it like a short, wide runway. Alameda's runways are 500 feet wide and the similarity in shape can be confusing. . . .

"In 1949, an R5D made a night approach to it believing it was what is now runway 25L, but took a waveoff. This was not seen by the tower as a carrier blocked the view of this approach from the Oakland range. This incident was unknown until the pilot, who was a former division officer, mentioned it to me.

"In 1950, I believe, an SNJ became confused in the area at night while trying to land at Oakland and actually landed on the pier. It crashed on the packing boxes and gear stacked there."

FAST FADE

"I was on a rocket and bomb flight and while I was positioning the S2F aircraft for arming, the left brake failed to hold. . . . I taxiied off the side of the taxiway and had to use the emergency handbrake.

"The cause of this incident was due to the fact that I had been riding the brakes, and when I really needed them, they didn't hold.

"I have been taxiing with at least 1000 rpm in order to keep the generators in use,—a habit I am sure many students have acquired. I was advised later that 1000 rpm continuously is far too much power for taxiing in the S2F.

"I suggest checking all radio gear in the chocks and only use the UHF (tower frequency) when taxiing. Doing this will cut a considerable load off the electrical system.

"On windy days, extra caution has to be used—90 percent of the time you will be taxiing downwind to reach the duty runway which tends to increase your speed, and may result in riding the brakes.

"My last point is to check the brakes in the chocks. Pump them before leaving the chocks and feel for pressure. Upon leaving the chocks the first thing to do is check them again; individually, then together."

LUCKY BOY

"I was flying a big *Banshee* on a night (black with weather tossed in) air intercept training flight down south. The hop was scheduled for 2 plus 30 which of course meant full tiptanks.

"I was certain I had turned on my tiptank switches, but *I actually hadn't!*

"Now all old *Banshee* drivers know that the fuel gage on the big bird reads fuel aboard including that in the tiptanks. There is a spring-loaded toggle switch which lets the pilot read 'internal only,' (usable fuel, that is) but I was so sure I'd turned the tips on and had checked for proper transfer that I assumed the gage was reading usable fuel.

"After about 1 plus 45 the controller at the GCI station gave me and my playmate a turn back to base. I read about 3400 pounds remaining and requested a couple more intercepts. Fortunately for me, my wingman had only 2200 pounds left so we returned and landed without incident.

"But friends, that's not the whole story. The fueling crew found that I had landed with two full tiptanks but only 13 gallons, or 78 pounds of usable fuel left!"

HEADMOUSE

Dear Headmouse:

Any aircraft, rotary or fixed wing, which carries a passenger should display the sign "Seat Belts Buckled" and "Shoulder Harness Secured." Just as the "No Smoking" reminder has become a familiar placard and a habit with all personnel who ride in an aircraft, so should these.

Recent helicopter passenger injuries have been attributed to the premature unfastening of these vital safety devices when ditching or crash landing.

. . . prior to entering any flight maneuver or turbulent air, the verbal and/or visual warning should be passed.

. . . unusual attitudes and extreme emergencies requiring an autorotation with no warning are everpresent probabilities affecting safe passenger travel.

. . . the helicopter is an aircraft, and *not* a tank, truck or taxi. It is a relatively unstable, highly technical machine, engineered and maintained to extremely close tolerances in order to provide the safest vertical rising aircraft available today.

Passenger safety can be increased, and pilot concern for their safety can be reduced if a passenger's SEAT BELTS FASTENED sign is made as familiar a friend as the NO SMOKING reminder . . . other public places.

Anymouse

Sage suggestions, Anymouse.

Very resp'y,
Headmouse

Dear Headmouse:

Severe blade stall was encountered while on a high altitude rescue mission in a HRS-3 with modified blades of honeycomb construction (pilot experience 1000 hours in HRS, copilot, 900 hours in HRS). Altitude was 7500 feet indicated with a density altitude of 8500 feet.

High altitude precautions were being taken—Speed: 50 knots indicated—RPM: high side of 2400—mild maneuvers—load: 6930, the air was smooth.

Entering a gentle right-hand turn—aircraft encountered severe blade stall which made the aircraft go into approximately a 45-degree nose-high attitude and a hard roll to the left.

Action was taken by lowering the collective and normal recovery was made.

Recommendations:

1. Pilots have a complete checkout on high altitude flights in helicopters and what to expect.

2. Pilots have a thorough knowledge of recovery from blade stall.

3. More data, from flight tests, on this type of flying should be available.

Anymouse

Good points. Tried to do this in "Down Collective"; September Approach.

Very resp'y,
Headmouse

Dear Headmouse:

. . . An article in May *Approach* furnished the part number for the special nozzle used to service flush type grease fittings . . . our catalogs failed to produce anything resembling this number . . . would you please give us the manufacturer's name and any other information that will help us obtain some of these nozzles . . .

JAMES R. HICE, ADC
Helantisubron Five
Key West

Alemite nozzle 314150 is available in Supply. Section "U" allowance, page 33, item 140, lists it as Stock No. R-41N-725. Until recently, some outfits were buying them "open purchase" from Sears and Roebuck.

Very resp'y,
Headmouse

Dear Headmouse:

"In a TV-2, during July, I stopped at Natrona County Airport, Casper, Wyoming. Because of the field elevation (5348 feet), the runway temperature (95°), and light winds, I checked the handbook takeoff rolls carefully.

"Under the above conditions plus full fuel load, backseat passenger and some baggage, the book claims takeoff roll is about 6300 feet. Though the duty runway was 8641 feet, seemingly much more than enough, I lined up for takeoff with the tailpipe overhanging the runway edge and with 30 degrees flaps.

"After releasing brakes I was very cautious about overrotating the aircraft. However, only after passing 8000-foot marker did I get flying speed, and even then my machine didn't feel like it wanted to stay airborne.

"The gradual upslope off the upwind end of the runway gave me a few more thrills but finally after getting the gear up, slow acceleration followed and I was able to climb out.

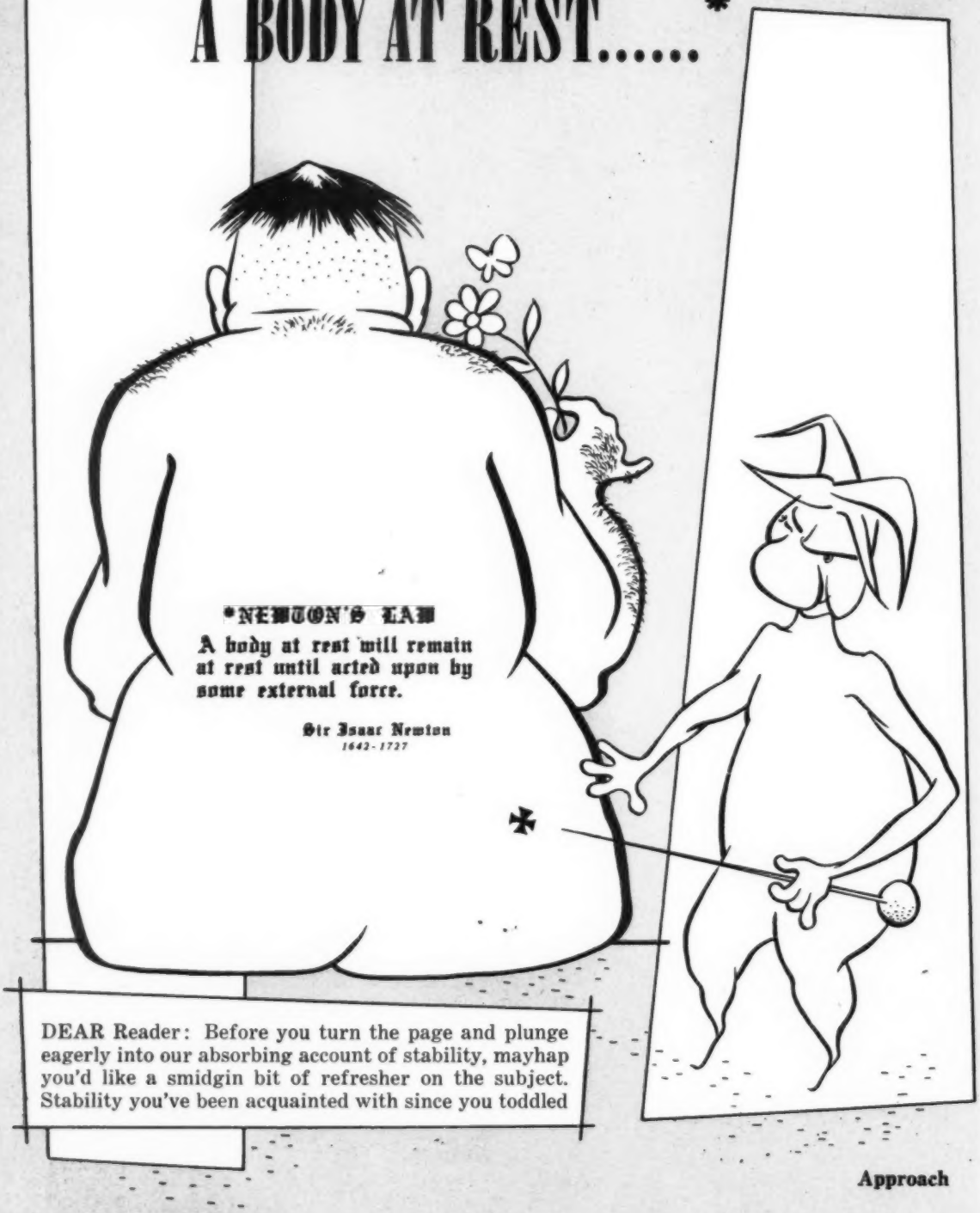
"My question is: Why are takeoff figures published only for new planes, new engines, controlled conditions and test pilots, instead of for our old planes, old engines, unusual conditions, and just plain aviators?"

Anymouse

Allowance is made in appropriate T.O.s for variations, including those of pilot technique (see "Why Aircraft Differ," page 3) and NASC is recommending preparation of quick reference, kneepad-size takeoff distance nomagram charts for various aircraft. If they become available Approach *will announce same. Meantime, squadrons might consider computing this dope for their particular aircraft.*

Very resp'y,
Headmouse

A BODY AT REST.....*



DEAR Reader: Before you turn the page and plunge eagerly into our absorbing account of stability, mayhap you'd like a smidgin bit of refresher on the subject. Stability you've been acquainted with since you toddled

off on your first unassisted step. But when airplanes are inserted into the problem, there's a deal more to understand about the matter.

First, let's say stability comes in two bundles, each containing three packages. Bundle No. 1 is labeled *Static.* Technically, this is the *initial* tendency of a displaced body to return to equilibrium where the sum of all the forces acting upon the body are equal and in balance.

Suppose you're sitting at the chow table, and dessert is G.I. jello—the kind that won't stick to the side of the dish. Say you're eating it from a general mess soup bowl, and you've just one small wad left right in the bottom of the bowl. You push it up the side of the bowl and it gets away from you and slides back to the bottom. This is package Alpha, or *static stability.*

Patiently you chase it again and it ends up on the table. Now you're ready to experiment and produce package Bravo—neutral static stability. You push the glob with the spoon and it moves as long as you push. Stop pushing and the jello just sits there in the new spot; that's natural static stability.

In the excitement of the chase, let's say you get your bowl turned upside down and now the jello rests calmly on the top of the inverted bowl. Ease it over to the rounded bottom. When it hits the downslope, instead of stopping it keeps right on sliding back down to the table. This is package Charlie—*static instability.*

Now that this is as clear as GI jello, have a look at bundle No. 2 — Dynamic; motion measured against time, which also comes in three flavors: Stable, Neutrally Stable and Unstable — but preceded by the word "Dynamic" instead of "Static."

Package Alpha of *this* bundle is likened to a coffee cup hanging on the end of a string. Start the cup swinging back and forth. Now watch the length of the swing arc get smaller and smaller, until it finally becomes motionless. This is *dynamic stability.*

Suppose the cup *hadn't* slowed in its swing, but continued with each swing being equal to the previous one (not possible without a nudge, but let's pretend). This would demonstrate package Bravo—*dynamic neutral stability,* wherein the motion remains constant with time.

Final supposition: Instead of decreasing or staying the same, each swing of the cup goes a little farther than the last. That's package Charlie; *dynamic instability,* since the amplitude *increases* with time.

There, for our purposes you have three packages of Static Stability and three of Dynamic Stability. In aviation, we parlay the Static with the Dynamic and wind up with a total of nine pairings, but we normally only deal with four pairs.

In airplanes, the various degrees of stability depends upon the job which the airplane is intended to do. A PBY for example, is built to cruise along rightside up with little or no coltish tendencies. On the other hand, the F9F-8 has an extremely rapid rate of roll, obviously for maneuvering reasons.

With which keynote address, we move into the business of developing a properly stable platform for our campaign in the clouds. . . .

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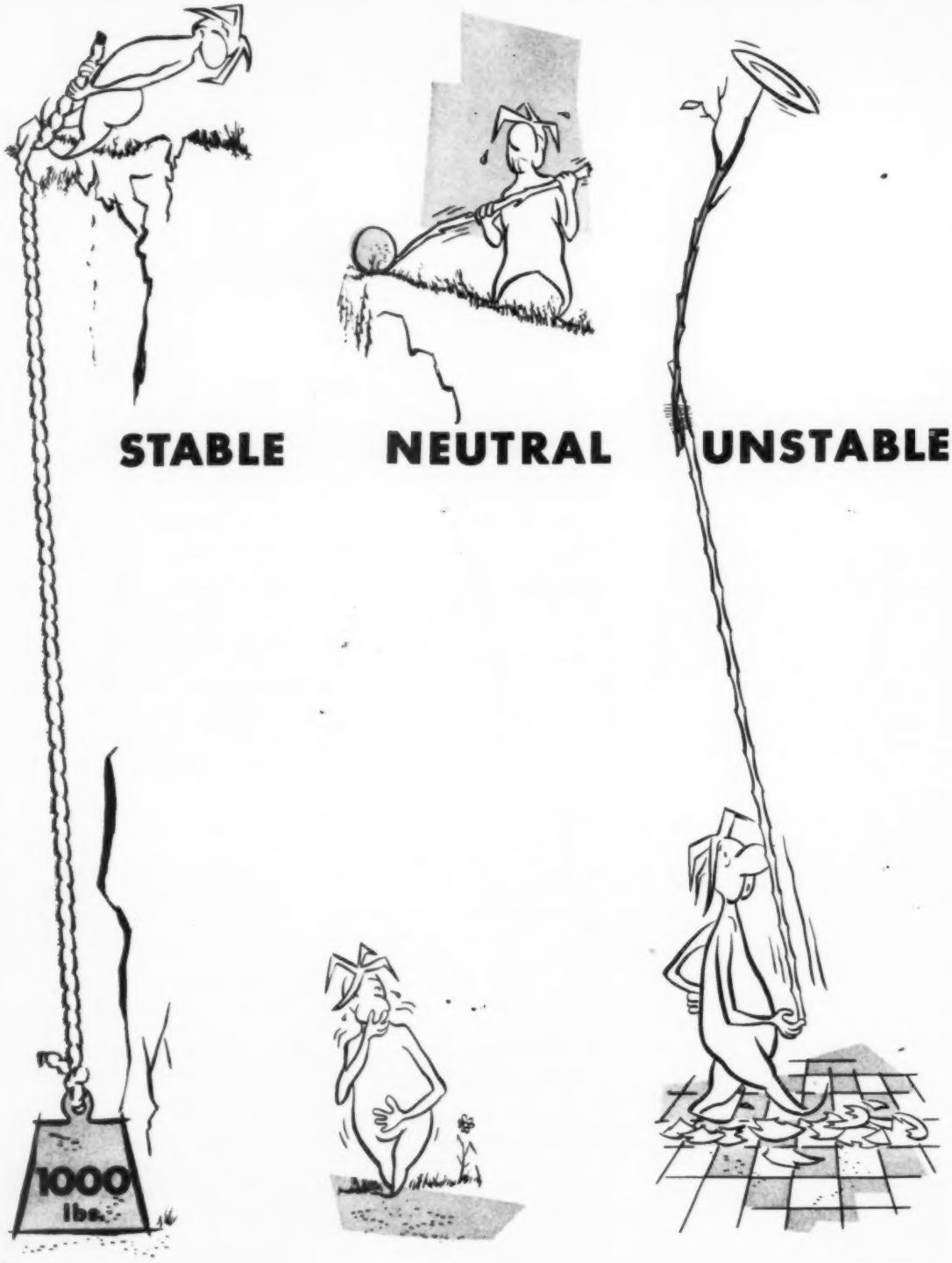
STABLE
NEUTRAL
UNSTABLE
1000
lbs.

A BODY AT REST.....

Continued

BACK in the days of the PBY, (first-tour pilots will please remove their hats) you walked about a block and a half from the sea-anchor locker back to the rudder. On the PBY-5A, amphibian version, the landing gear was hung about a half mile below the wing, and as a result, son, *there* was a stable airplane. So stable, in fact, that it took two men and a boy to displace the old girl from straight and level flight.

About the same time, the fighters of the day, like the fabled F4B–4 or the FF–I (VF types bow head twice in direction of Pensacola) had plenty of stability but they could be turned around handily in a dogfight. Quite nimble they were.

When we moved into the smokepole era, stability was left in the jetwake along with several other design characteristics of long standing. Today's pilot, therefore, is in the driver's seat of a rather nervous steed having a *built-in marginal* stability. This means that in controlling today's airplanes, when this inherent marginal stability leaves him, the pilot is in trouble. In the main, the pilot is apt to get into this marginal stability area at high angles of attack.

This situation, of marginal stability at high angles of attack, in turn made necessary the development of a new species of black boxes, known as "yaw," "pitch" and "roll" dampers, depending on the motion they are intended to control. So, let's give a quick look at the "axles" about which we know stability to be controlled.

Directional Stability

Going into the first of these —*Directional Stability*—this means the airplane tends to keep moving in the direction it is traveling—with no tendency to turn around and fly backwards. This quality of directional stability is in direct proportion to the length of the walk from the trailing edge of the wing back to the vertical stabilizer. If the walk is about a block and a half, as in the case of the PBY, you can be fairly certain that no matter what you do with the rudder, the tail will stay behind you.

On the other hand, if there is practically no distance to

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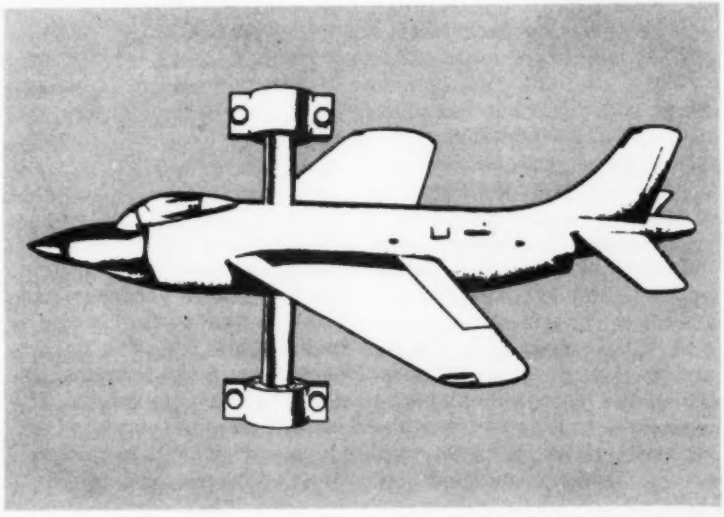


A BODY AT REST.....

Continued

the tail, as in the F7U, FJ, F9F, F3H, et al, don't be sure the tail will always be behind the nose, because at high angles of attack, sufficient yaw can be introduced to get the airplane to fly sideways, or maybe even turn around and fly backwards. For the dubious, confirmation of this can be obtained from any pilot who has survived the "Thing" in an F7U.

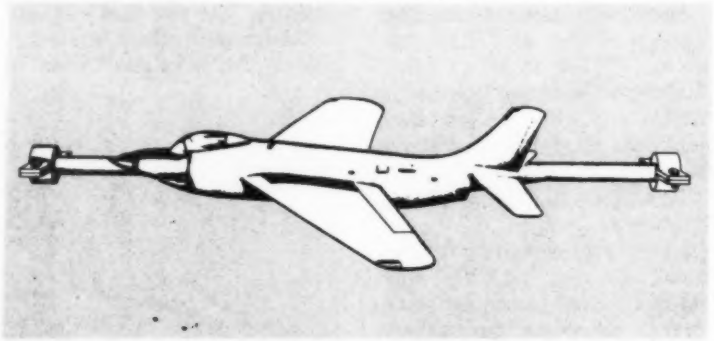
And whether you call it yaw, or slice, or slip, it still refers to directional stability, and it gets critical at high angles of attack. Directional stability is a function of "coupling", which is the length of the walk from the trailing edge of the wing back to the tail. A long walk means the airplane is long-coupled; a short walk, a short-coupled airplane. *Short-coupled airplanes have marginal directional stability at high angles of attack.*

Lateral Stability

Lateral stability is a function of dihedral, sweepback, aileron *vs.* spoiler controls, aspect ratio, wing plan form, and a host of other factors which the aeronautical engineer loves to fling into the air as a diversionary tactic and escape from a conversation during the attendant confusion—much as a squid ejects his ink and backs out of trouble.

For our purposes, go take a look at the bird you are flying and approach it head-on. Are the wings bent up or down, or are they straight? Now take a bird's-eye view. Are they tapered, straight, or swept back? Combine this knowledge as follows: A *straight* wing with no dihedral has *neutral* stability. If you find a *straight* wing with negative dihedral, i.e., the tips droop toward the ground, send us a wire because somebody at the factory made a mistake, and if he did, the airplane would have lateral instability but completely. The instant you get such a machine airborne it would roll over and there you would be—on your back—and the machine would resist any attempt to right it. As we said, such a beast is not supposed to exist.

If your top view shows a high, sweepback wing, there may be a little negative dihedral from the bow-on view—this is because the sweepback has the same effect as a lot of *positive* dihedral, and to prevent your fighter being hard to roll, the designers crank in some negative dihedral to offset the effect of sweepback.



At high angles of attack, this exaggerated sweepback does a real nasty Jekyll and Hyde. Get a model of the particular little jewel you fly and look at it head-on, with the nose cocked up slightly. Looks just like a lot of negative dihedral, doesn't it? That's

because it *is*.

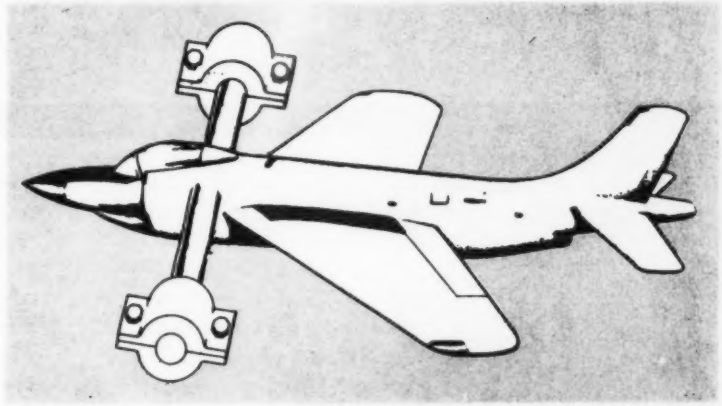
Ever notice, you sweptwing drivers, a tendency of the wings to want to wobble in a nose-high landing? This is the negative dihedral effect of sweepback trying to roll the airplane on its back, and when you lower flaps, you decrease your effective dihedral; hence your lateral stability.

Longitudinal Control Stability

Walk again to the airplane; this time look at the profile. How far is it from the trailing edge of the wing to the horizontal stabilizer? Whatzat? Sure, we're back to the coupling again. Short walk, short coupled; long walk, long coupled. If any of you find a long-coupled fighter in service, let us know, because they disappeared along with the hoop skirt and the buggy whip. Everything today is short coupled. Short coupling means marginal stability and controllability at *all* angles of attack.

This means that you cannot trim it up at altitude, to let go of the stick and take time to evaluate the inherent stability of Playboy 's playgirl, or perhaps to work a little navigation as in days of yore. Unless you have a good autopilot in full commission, you have to hold the critter's nose where you want it.

To sum up, we've talked about the three "axles" of controllability and stability, discussing each as a separate thing. Alas and alack, this is not so. The airplane is firmly stitched together and anything which affects one element of control affects all three. And you, the pilot, well know that in airplane driving you have to worry about pitch, roll and yaw at one and the same time.



That maneuver which most influences motion about all three "axles" and the stability thereof, is a high angle of attack maneuver, whether it be due to slow speed in landings or in high G-maneuvers. High angles of attack reduce stability about all three axles every time.

Our secret for success? If you're driving a high-performance sweptwing smokepole—*Keep it moving!*

This guarantees angles of attack well below the "touche" angle, and when you have low angles of attack you are loaded with stability. If not loaded, at least you have enough to keep the airplane from catching you completely by surprise. And what do you do when you have to have the "touche" angle applied? Ride it like a frisky colt, and be as wary as you are when the wife asks you to comment on the new hat—Watch it! *It's trying to throw you!* ●

An ancient P-Boat pilot meeteth three staff members bidden to a conference and detaineth one.

It is an ancient P-Boat Pilot,
And he stoppeth one of three.
"By thy long grey beard and glittering eye,
Now wherefore stoppest thou me?"

"The conference doors are opened wide,
And I am next to speak
The staff are met, the agenda set
'Tis aircraft safety we seek."

He holds him with his skinny hand
"There was a ship, a *Mariner*," quoth he.
"Hold Off! Unhand me, greybeard loon!
Else with my briefcase I smite thee!"

He holds him with his glittering eye,
The Commander must needs stand still
And listens like a simple Navcad
The P-Boat Pilot hath his will.

THE RIME OF THE Ancient Mariner

The Commander moved to the coffee bar:
He cannot choose but hear;
And then spake on that ancient man
That bright-eyed *Mariner* pilot.

" 'Twas daylight when we cleared the ramp
On a night bounce hop, you see
A pilot for drill on the left side
And I in the right seat, PPC."

The ship was veered, the seadrome cleared
And round and round it flew
All in a black coal hopper sky
With a moon to aid the view

And far below some lights did show
But those in charge of lumination
Were as idle as a painted crew
Upon a painted station

But Hark! A coxwain, lighting buoys,
Does check the inner seawall light
And though the starboard one shows red
Its green-lens'd mate he cannot sight.

During the flight, as darkness falleth, the seadrome light tenders faileth, one and another, to replace a seawall entrance light.

Straightway he reports the missing orb,
The Dispatcher passed to Station Ops
And they had done a hellish thing
In buck passing it was tops.

From man to man the warning passed
Nor ever did the Duty Officer get the word
Of a pattern of light no longer right
And the Tower of course never heard.

"Final landing now complete
The shoreline to the left
And the flickering Aldis lamp went out
Of light we were bereft."

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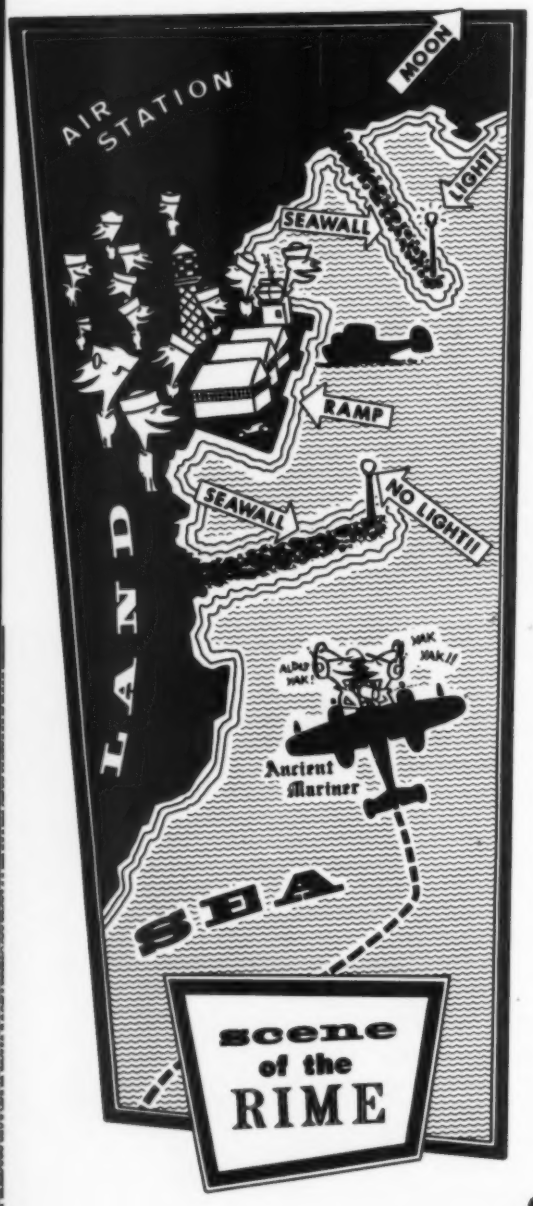
The Ancient Mariner

Continued



AirPac save thee, ancient *Mariner!*
From the peril the dark doth hide
Why lookest thou so, you cannot see
A seawall awash beneath the tide.

Deceived by the altered light pattern, the Mariner runneth aground on its ramp approach.

The Aldis lamp begins to work
And the sight compels a clutch
"There, dead ahead, Oh Lord
Rocks, and blocks and such.

"Betrayed by lights we'd turned too soon
But the cause I mourn aloof
Around *my* neck the blame is hung
The PPC must assume the goof.

"Water, water, everywhere,
Except beneath our keel.
Are those her ribs through which the moon
Does peer where the skin is peeled?

"I looked upon the bashed-in hull
But or ever a prayer had gusht
A wicked whisper: 'AAR'
Made my heart as dry as dust.

The staff-brass scoffeth the plea of the pilot, who bemoaneth the cause of his misery.

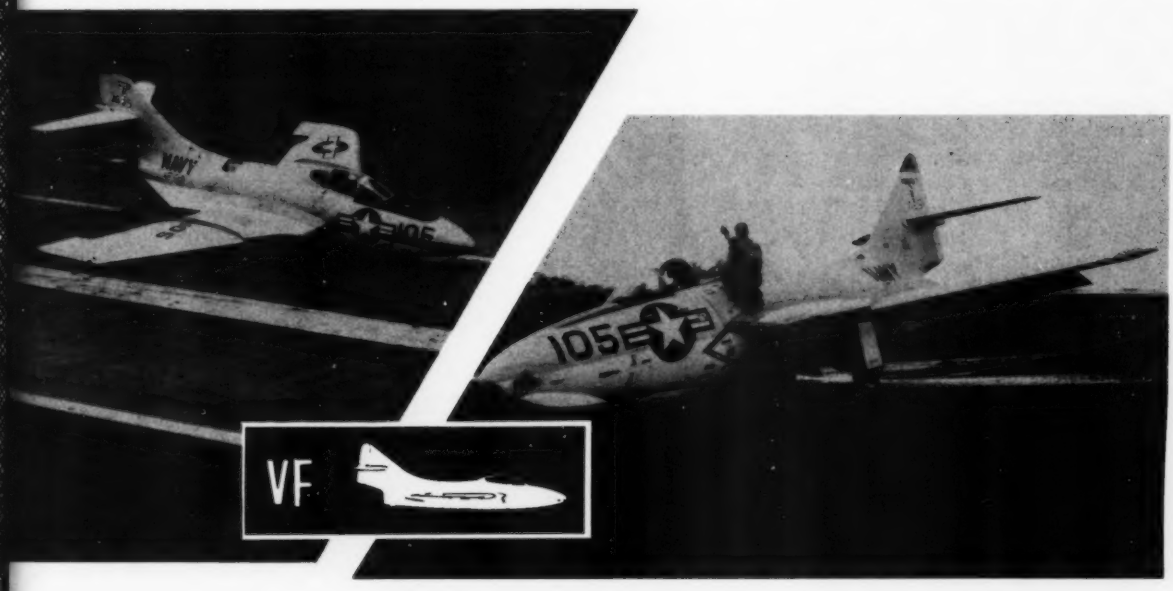
"I fear thee, ancient Yoke-Boater!
And thy causes secondary!"
"Be calm, thou quaking staff man
No long green table needst thou worry.

"Farewell, farewell, but this I tell
All outfits great and small
He fareth well who worketh well
And gets the word to *all!*"

The Commander goes like one fair stunned
And moans "These tales are such a bore,
Why do these characters always pick me?
I should have stood in the Chaplain's Corps!"

Truth and Consequences

A DIGEST OF
SIGNIFICANT AIRCRAFT ACCIDENTS



IF AT FIRST—If the *Cougar* in the upper photo bears a singular resemblance to the F9F-8 in the lower picture—there's a reason. Happens to be the same airplane. Matter of fact it also happens to be the same pilot, same day, same flight—only the locations were changed to permit the pilot to make an emergency landing ashore when his carrier landing failed to snare a wire.

Returning to the carrier after being launched on a gunnery flight, the pilot began a normal approach to his first carrier landing in 40 days. (He had a total of 14 landings in the F9F-8). Still in a normal position at the cut, the pilot nosed up on receiving the cut, to sail over the top. He then dove for the deck and hit with enough force to collapse the nose gear and starboard main gear. Sliding up the deck in this fashion, the pilot added power and managed to get airborne again.

Directed to return to the beach, the pilot made a straight-in approach to the runway and exhibited excellent technique in landing safely with minimum damage

In assigning pilot error to be the primary cause of the accident, the AAR board added that "the fact that the pilot had not flown for an extended period of time prior to the accident could possibly be considered to be pertinent as secondary cause factor."

Truth and Consequences

Continued

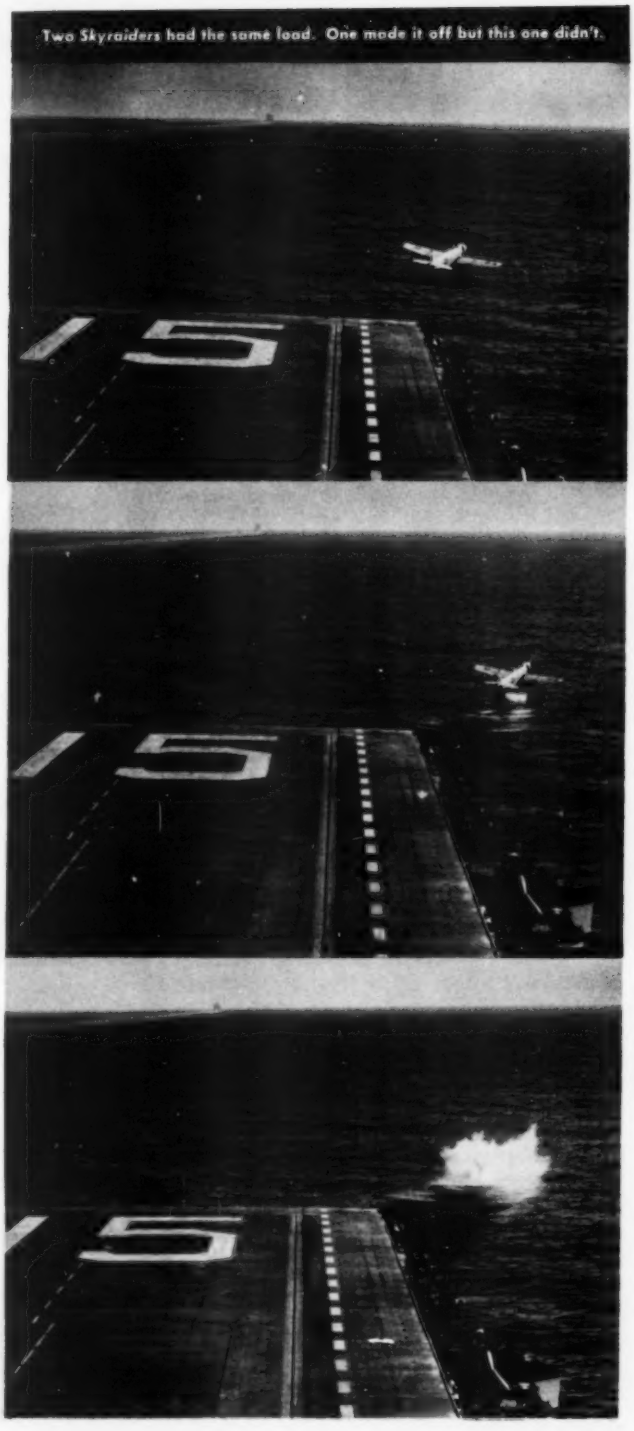
FRIGHT DECK LAUNCH — Two AD-6s aboard an aircraft carrier were each loaded with twelve 250-pound bombs and three 1000-pound bombs. Jets were catapulted off and the prop aircraft deck launched. Last of the single-engine prop planes were two heavily-loaded AD-6s.

One of the two was flown by the air task group commander. He was moved forward on the flight deck to the 780-foot mark, turned up, then waved down the deck. Reaching the extreme forward end of the deck the pilot rotated his aircraft in an attempt to fly the AD-6 off.

Instead of flying off, the plane rolled off the bow and settled about 30 feet before gaining sufficient speed to maintain level flight. The CAG later said it was "the closest I have come to going in the water yet."

While the first AD was being launched the second was taxied into position also at the 780-foot mark and turned up. Given the launch signal, the pilot added full throttle and commenced a straight takeoff run. Just forward of the number 1 elevator the plane was rotated and the tailwheel was seen to come back to the deck.

As the plane reached the end of the flight deck the front wheels dropped off and it settled in a 3-point attitude. Gear was jerked up imme-



Two Skyraiders had the same load. One made it off but this one didn't.

diately but the settling continued. The three 1000-pound bombs were jettisoned just before the plane struck the water in a 3-point attitude. A helicopter recovered the uninjured pilot.

In an effort to find a primary cause the accident board established the relative wind to be a little over 31 knots. *Adding the temperature and specific humidity correction* to the basic takeoff roll for 31 knots gave a total of 875 feet required for the gross weight used. No significant pilot error or salient discrepancies in technique were revealed.

It was concluded that the primary cause of the accident was insufficient deck run allotted to allow a safety factor for existing marginal wind, temperature and humidity conditions and the board recommended that aircraft at maximum load conditions be catapulted under all circumstances.

Note: See also a discussion of "Why Aircraft Differ," page 4.—Ed.

CHECKER'S WOE—While checking a prospective R6D first pilot, the checkpilot set up a simulated engine-out and a hydraulic failure for the final landing.

The descent and approach checklists were completed before turning base and the hydraulic system pressure was bled off by the checkpilot. Downwind, flaps were lowered 20 degrees by the emergency pump. After turning base, the gear was dropped by free-falling and a safe indication was obtained.

On final approach the gear handle was put in neutral position and forgotten.

As additional flaps were requested after turning base it was necessary to return the gear to NEUTRAL so as to allow the pressure from the emergency pump to actuate the flaps without delay. However, the gear handle was left in NEUTRAL for the remainder of the landing.

After touchdown, reverse pitch was used and after the throttles were returned to normal the pilot reported a loss of nosewheel steering and only weak braking action. The checkpilot then took over and turned off the runway by using the throttles.

When the aircraft had slowed to about five knots both the jumpseat pilot and the pilot observed the gear handle in the neutral position with the unsafe light on. The pilot put the gear handle DOWN and with that action the nose gear collapsed.

The crew involved agreed that the accident could have been prevented by checking the gear selector handle and returning it to the DOWN position before touchdown. In putting the handle down the accident board felt that the pilot momentarily raised the handle, allowing pressure into the up lines and collapsing the nose gear. It was found after the accident that a movement of only one-half inch out of NEUTRAL position is all that is necessary to allow sufficient pressure to enter the up lines and actuate the gear.

Truth and Consequences continued

OVEREXPOSED — On a night search mission a P2V-5F flew at 11,000 feet for at least 5 hours and was at 13,000 feet for about 2 hours. During this time the pilot used oxygen for about 2 or 3 minutes on two occasions.

The pilot commenced his letdown from about 100 miles at sea and upon arriving near his base he was informed that the weather was VFR with intermittent rain showers. After a circling approach the touchdown was made in a flat or nose-level atitude at about 90 to 95 knots.

Immediately after the contact the aircraft began to porpoise. The nosewheel hit the runway during four bounces while the pilot finally recovered using some engine power and applying back pressure on the yoke.

Nosewheel steering became ineffective during the last part of the rollout and the pilot stopped the plane at the end of the runway. The nosewheel had shattered with only the hub remaining on the axle. The tire and tube were wrapped around the hub and this, together with the fact that the runway was wet, limited the damage done to the aircraft and nosewheel strut.

It was concluded by the accident board that the perception and reactions of the pilots were hampered by their long exposure to the effects of high altitude, and that this is considered to be a contributing factor to the accident. The board recommended that all pilots receive additional and regular indoctrination concerning the effects of hypoxia on their performance.

The mandatory use of oxygen as required by existing directives cannot be overstressed—specifically the requirement for oxygen on night flights above 5,000 feet, and all flights above 10,000 feet.

BUDDY CHECK — During a cross-country flight one of two jet aircraft developed radio trouble and could transceive only on channel one. At destination, the leading pilot received clearance for both to land. They broke over the runway and the wingman landed with one wheel up.

The only outside warning the pilot had was the tower which couldn't contact the pilot on the tower frequency.

A suggestion was made that if any communications difficulty is experienced, the gear should be lowered while in formation. This permits a gear check before the break.

SQUEEZE PLAY — *1105*—F9F-8 blew a port tire on landing; advised tower of occurrence during rollout; taxied clear of duty to await arrival of tire and tow from squadron.

1106—Squadron notified by tower.

1108—Pilot stands up in cockpit to attempt visual inspection of blown tire; trips canopy lever which closes to put squeeze on pilot. He squirms desperately and manages to kick lever to open canopy, and crawls to ground.

1110—Squadron repair crew sent to aircraft with tire and tow.

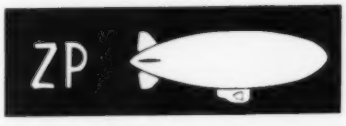
1115—Repair crew reaches scene; finds injured pilot on ground. Crewmember sent to nearest (tool shack) phone and summons ambulance to pick up pilot at end of runway.

1118—Ambulance searches unsuccessfully for pilot; calls tower for additional directions. Tower knows of no injured pilot. Ambulance heads back to dispensary.

1120—Tire repair crew now flags a passing FJ whose pilot advises tower of injured pilot on taxi strip off end of runway.

1122—Ambulance recalled by radio and sent to proper location of pilot.

1125—Ambulance returns to dispensary with pilot for preliminary examination.
1128—Squadron readyroom advised of injury to pilot.
P.S.:(1) All hands thoroughly briefed on procedure of reporting accidents to those concerned.
(2) Squadron operation doctrine modified to include (a) insertion of canopy lever safety pin immediately on turning off of runway after landing; (b) removal of canopy lever safety pin only on departure from line.
(3) CAG endorsement on incident report included recommendation for re-evaluation of location/operation of F9F-8 canopy lever.
(4) If this sort of thing can happen once. . . . How's your reporting procedure? And do all your F9Fs have the safety pin installed?



WHO'S WATCHING THE STORE—Following a normal preflight, a ZSG-3 airship was unmasted at about 0618 for a takeoff under VFR pre-dawn conditions. Takeoff was normal and a climb was made to 500 feet. Aboard the airship were: The command pilot, occupying the rudder position; a copilot in the command position; a copilot in the elevator position; a navigator; four radiomen; two mechs and one rigger for a total crew of 11.

On reaching 500 feet the elevator pilot began trimming operations and setting cruise power. The rudderman initiated a gentle turn and, noting a discrepancy in the carburetor air temperature, concerned himself with carburetor temperature control. The pilot in the command pilot position turned aft to instruct the navigator to set his chronometer. The navigator was making his initial squadron flight. None of these, nor any other crewmember noted or reported any condition abnormal to flight, but. . . .

Unnoticed, the airship began losing altitude and . . . crashed in a wooded area.

Unnoticed, the airship began losing altitude and seven minutes after takeoff it crashed in a wooded area two miles away from the takeoff position. The port engine nacelle and outrigger were torn from the car and the car and envelope received strike damage. There were no injuries except for a slight cut on the forehead of the pilot in the command seat.

Citing lack of elementary alertness and vigilance by all pilots concerned, the aircraft accident report and endorsements ascribed pilot error as the primary cause in that no pilot concerned was completely cognizant of primary flight instruments.

The airship was unmasted in equal trim and the forward damper was open for takeoff. The starboard airscoop was opened about four inches. Reaching 500 feet, the elevator pilot thought the airship extremely tailheavy due to the dynamic tailheavy condition of a statically heavy airship, and he pumped forward and valved aft. This resulted in a nose-heavy condition for the static heaviness and airspeed. At 400 feet the elevator pilot noticed his loss of altitude and applied up elevator, but not sufficiently to check his rate of descent. Concerned with engine instruments, the elevator pilot did not notice the altitude loss from 400 feet to about 150 feet, when he applied additional up elevator and full power, which was inadequate.

The Case Against

ANTI-HISTAMINES

In or out of the readyroom, pilots will be interested in the subject of this briefing.

THIS is the tale of a test, the story of a study which has interest for people in general and important implications for pilots in particular.

It shows how the test is conducted to rule out chance; and shows again that work is constantly being done to protect the pilot; and that command (and the flight surgeon in this case) has good reasons for their advice.

You wouldn't take a sleeping pill before flying?

Most of the anti-histamines are better at making you drowsy than several of the sleeping pills! This is the surprising outcome of tests conducted specifically to determine any hazardous side effects which the anti-histamines might have upon aviation personnel.

Your flight surgeon has advised you against flying after taking anti-histamines. These relatively new drugs have rapidly become almost as commonly accepted as aspirin in the home medicine cabinet. Widely advertised, purchased without prescription, they are mistakenly assumed to be harmless. True, they are not known to lead to physical addiction as many sedatives do, but they are far from harmless for anyone controlling a dangerous piece of machinery—especially a complex, expensive aircraft.

To find out just what side effects might result, the Air University School of Aviation Medicine, USAF, Randolph AFB, Texas, conducted an experiment (#55-35) which was carefully controlled in order to eliminate inaccuracies from chance differences or variations in individual responses to the drug.

The Test

For the test they selected more than 3000 healthy volunteer male subjects, 17-22 years of age. The sedative effects of the drug were evaluated by making an electroencephalogram, known as an EEG. This is a tracing of the electrical impulses from the brain, (as the more familiar electrocardiogram is a tracing of electrical impulses from the heart). The normal EEG pattern produced by the brain when a person is asleep is different from the pattern of wakefulness.

Such a test as this would not be reliable if one subject had slept around the clock while another was out until the wee small hours; therefore, such differences were

eliminated.

All volunteers were basic trainees from the same group, and had undergone identical training schedules. The night before testing the anti-histamines they went to bed at 9 p.m. and all were awakened at the same hour and followed the same routine including a morning nap before the test. Meals were controlled, and no stimulants (coffee, tea, carbonated beverages) were allowed. During the test they watched a movie, so they were even thinking about the same things as nearly as possible!

Thirty-three anti-histaminic drugs were tested, and several sedatives. One of every eight men was given a 'blank cartridge'—a capsule which looked just like the others but contained no drug. However, no one knew whether he was taking a blank, an anti-histamine or a sedative.

It was found that, "in their ability to produce drowsiness, these anti-histaminics are at least as effective, 90 to 130 minutes after medication, as any of the sedatives with which they were compared." Those with the strongest sedative action make you drowsy most quickly. "However, the sleep-inducing capacity of all sedating anti-histaminics seems practically the same."

The study proves that many anti-histamines induce drowsiness when they are given in the doses recommended for the relief of allergic conditions. Six of the 33 tested had no discernible sedative effect. However, this doesn't help much, because those which are usually considered the best at allergy-relief are also best at causing sleepiness.

An Accident

One recent *pilot-error* accident attributed to anti-histamine involved an F2H-3. The pilot was on an air-to-air gunnery flight. After his fifth run he did not get the nose of the aircraft high enough, and the tow banner struck the underside of the nose and the top of the bar struck the leading edge of the wing about midway between the port engine and the wingfold. The bar became imbedded in the wing after making a cut approximately 18 inches long from the leading edge of the wing. The trailing edge was cut in about 8 inches.

Fortunately a no-flap landing was made successfully with no injury to the pilot. Investigation disclosed that he was suffering from a cold at the time of the accident and had taken anti-histamines against the advice of the flight surgeon, whom he had consulted the night before.

A person taking anti-histamines should not fly. Poor physical condition and self-administered drugs were assigned the blame for this accident. The pilot's reaction time for breakaway from a slightly flat gunnery target run was insufficient for properly clearing the tow target.

After the accident he said, "I've learned my lesson now. Somehow I thought you doctors were exaggerating the effect of these drugs on the body."

The study and the accident report are factual, and are not meant to be a criticism of anti-histamines. They are valuable drugs and have a definite place. But that place is not in a pilot or aircrewman who is going to fly, nor in a maintenance man or Navy driver on duty. The time and place for their use should be determined by the flight surgeon. Many of these drugs have names which do not sound at all like 'anti-histamine,' so the best rule to be guided by is *no self-medication*. ●

A REPORT

FIRST USE OF *Automatic* LAP BELT —

IT wasn't the first flight of the day and no particular trouble was anticipated as the test pilot took off in an FJ-4.

But it came, in the form of an uncontrollable spin. The pilot tried every means to regain control while the altimeter spun down—down to 15,000 feet. This was his predecided altitude for ejection under these particular circumstances of inverted spin; if he followed his plan . . .

His efforts turned to ejection. G-forces were about minus 1 and he had no difficulty in reaching the curtain handles. One hard pull with a slight pause as the canopy left and he was out, in a downward ejection from the inverted aircraft. There was no sensation of ejection force or blast.

He remembered then that this ejection seat was fitted

WHAT THE MANUFACTURER SAYS ABOUT AUTOMATIC LAP BELT OPENING SYSTEM

The automatic seat lap opening system is a pilot safety device for use in the emergency escape from the airplane. The system has been added to FJ aircraft by authority of Aircraft Service Change No. 275.

The system is safe and relatively simple and requires a minimum of maintenance. The automatic opening of the lap belt after the seat has been ejected from the airplane gains for the pilot precious seconds at this critical time—seconds that otherwise would have to be spent in manipulating the lap belt buckle open by hand.

The automatic lap belt system will also be used in combination with the automatically-opening parachute.

The automatic lap belt provides automatic separation of the pilot from the seat approximately three-quarters of a second after the seat

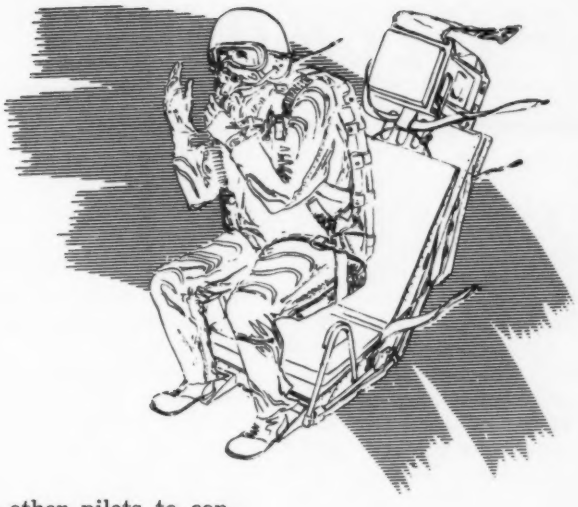
with the Navy automatic lap belt release. It was well-tested, but this was its first emergency use. It functioned perfectly. Simultaneously with his release of the curtain the seat fell away from him, more quickly than he could have separated it manually.

Now, the problem was to stop tumbling. Spread-eagling failed to reduce rotational velocities, acceleration forces were felt in all extremities and he was becoming disoriented. He exerted all his strength to bend his knees and clasp his arms around them. After two or three tries at this, the rotation was reduced.

He opened his parachute manually at 11,000 feet and encountered no further difficulty until the landing, when he hit hard. However, his only discomfort was numbness of the legs for a few minutes. The ejection and tumbling had not caused any injury.

This accident happened to a test pilot, who is well-trained, and well-aware of the daily hazards and safeguards of his vocation.

It's a valuable-type experience for other pilots to consider well because the pilot was able to control severe, disorienting tumbling without receiving any injury; because it was the first emergency use of the Navy lap belt; and because it illustrates the inestimable value of having detailed plans, including predetermined altitudes, for ejection under specific circumstances. ●



has been ejected from the airplane. The time delay allows the pilot to remain strapped to the seat until he has cleared the airplane and also ensures that no difficulty will be encountered in releasing the seat belt.

The automatic actuating unit is located on the right-hand side of the ejection seat, and is connected to the belt release by a cable and to the right-hand cockpit console by a link arrangement. The actuating mechanism contains an explosive charge, a firing pin and an operating piston.

As the seat is ejected, the connecting link causes the firing pin to detonate the explosive charge. The firing of the charge creates pressure, causing the piston to snap a length of soft safety wire and move to the top of the mechanism.

The piston movement retracts the cable connected to the buckle release and allows the retaining cam to release the buckle link, causing the seat belt to separate. The pilot can then perform normal parachute descent.

—NAA Service News

Credo

The Flight Surgeon's primary duty is the preservation of Human Life; which is accident prevention of the highest order . . . . . .

THE local flight surgeon is a source of skilled and valuable assistance which each flight safety officer should draw upon at every opportunity. Factors such as fatigue, mental stress, physiological disturbances, and fear of flying are familiar to the medical man and he can detect these conditions sooner than anyone else. These conditions are a primary cause of many of our pilot-error accidents which in turn comprise the bulk of aircraft accidents.

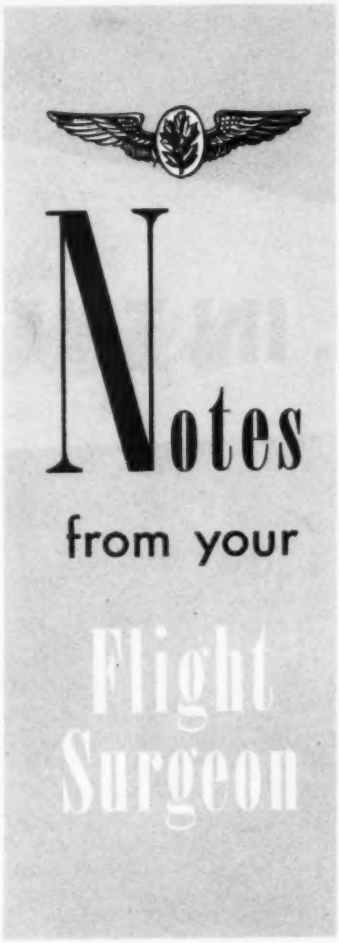
Our periodic physicals give only an indication of our general state of health. Between check-ups a pilot might fall into a state of nervous tension which would assume serious proportions if unchecked by the flight surgeon. All pilots must be encouraged to consult their flight surgeon whenever they feel ill or upset; such as by an emotional stress due to financial or marital troubles.

A physicial ailment is not necessary for a trip to the medical section. Nervous systems are more easily, and more subtly, injured than flesh and bone. Many of our recent accidents are caused by untreated physical and mental ailments. This type of flight safety hazard is most familiar to the flight surgeon and, unless a flight safety officer works closely with the flight surgeon, he is helpless in remedying these cases. The flight surgeon's primary duty is the preservation of human life; which is accident prevention of the highest order.

You can do two things to stimulate this valuable assistance. First, know what the flight surgeon can do for you in rooting out these intangible potentials. Second, educate your aircrew members to consult the flight surgeon whenever they feel the need.

The flight surgeon has an important role in your safety program. He should be included in every flight safety meeting. The best way you can encourage the pilots to seek his confidence is to insure that they understand his importance as a member of the flight safety team in the role which his training has equipped him to perform.—*Mag 11 Safety Bulletin.*

CLASSIFIED WANT ADS



BURN PROTECTION

An AD pilot survived the crash of his plane, but he is at the moment grounded indefinitely with burns of the extremities and face, including eyes.

The flight surgeon suggests: "In my opinion the burns would have been minimal or even possibly prevented completely if: the right glove had been worn, goggles and oxygen mask had been used, and the summer flight suit had been equipped with some type of cuff which would not slip up the arms and legs leaving areas of unprotected skin surface."

RELEASING BELT AND CHUTE

Your flight surgeon has two tips for use with the automatic lap belt release and parachute opener.

First, don't take a "death-grip" on the face curtain and refuse to let go. This is based on the fact that the lap belt will release sooner than you think—faster than you could possibly do it manually. If you're still clutching the face curtain when the belt separates, the seat will be flipped out from under you with you hanging on to the face curtain. It can become entangled in your parachute, or you could be injured when the seat falls past you.

As an extra precaution, when you pull the curtain, keep your thumbs alongside your fingers.

The second tip: if you have to use the manual release for a defective lap belt, you will have to use the manual release for the chute. If the belt separates automatically, the chute *can still be* operated manually above the preset opening altitude, *but*, if the belt is opened manually, *the chute must be opened manually.*

FOR A CUTLESS *CUTLASS*

The F7U-3 seat shelf is designed to accommodate the 28-foot back-type parachute, R83–NAF–602512-4, in accordance with the section H allowance. If the thin back parachute (R83–P–66250) is used, there is a possibility that the protruding seat shelf may injure the pilot in case of accident.

SOUND OFF

Two new films on high intensity noise have been distributed to district training aids libraries, aviation libraries and Marine Corps film libraries.

Both films have been prepared for medical department personnel. Film MN-9318a is Medical Aspects of High Intensity Noise—General Effects. Number MN-9318b is Prevention of Hearing Losses. This film is restricted to medical department personnel.

RED OR GREEN?

Just before this pilot landed his F9F-8 wheels-up, he noted a "green" flare on the left near the periphery of his vision, and thought it was FCLP.

Actually, the flare was red! It is a well-known physiological fact that color determination is very poor with peripheral vision. This pilot mistook red for its complimentary color, green. In this case the medical officer believes the flare was fired too late for the pilot to take corrective action even if he had perceived it correctly.

The wheels-up landing itself was caused by the usual factor of interrupted habit pattern, coupled with the inadequate feed-back information from his instruments. Following a simulated flameout approach the pilot raised his gear but kept his flaps down, which gave him a slow-flight condition at a point in the landing pattern which is normally accomplished by lowering the landing gear before the flaps.

AND AGAIN . . .

Some of the apparently minor physical and psychological factors which are included among accident causes may become important when they are added up. Any one of them may be the "straw that broke the camel's back." (See "Red or Green" elsewhere on this page.)

The F9F-8 pilot landed wheels-up. At the time of the accident he had been on duty 12.5 hours, so fatigue may have been a factor. It may have been the cause of the break in habit pattern, which was the cause of the accident. In addition, the red warning light in the gear handle was inoperative.

His normal habit pattern is to raise the gear after each pass. This time he made five passes. On the first the gear and flaps were down, on the second up, on the third down, on the fourth up; and on the fifth they were down—that is, he thought they were down until he landed wheels-up. Power was added too late after waveoff was received.

FILL IN THE

AIRCRAFT Accident Report, OpNav Form 3750-1, Revision 11-55, has an item in the "cause-factors" section entitled "Administration Error." Although the cause of an aircraft accident should never be a factor of administration error, such cases have been cited.

Accidents have happened when the various technical directives and manuals, which are issued by the Bureau of Aeronautics, were not properly disseminated. If the pilot doesn't have available to him the latest revisions of the "Pilot's Handbook," or if maintenance personnel have obsolete, rescinded or superseded directives, an accident can well be the result. Technical information, no matter how good, is worthless if not in the hands of all who need to know. Obviously, timely compliance with technical directives is essential for safety in aviation.

Knowledge of how technical matter is distributed can help you detect irregularities that might compromise safety within your organization. Here is a brief of how the system works in general:

Information as to allowances, procurement and indexing of technical publications can be found in the following references:

- BuAer Allowances List for Naval Aeronautic Publications and Forms, section K,

Gaps

NA00-35QK-1.

- BuAer Manual, Chapter 15, NavAer 00-25-500.
- BuAer Instruction 5605-.1A of 19 January 1955.
- Naval Aeronautic Publication, Numerical Index, NavAer 00-500.
- Naval Aeronautical Publication, Equipment Applicability Index, NavAer 00-500A.

The NavAer Publications Indexes are issued periodically to provide a current listing of publications dealing with the technical operation and maintenance of aircraft and related equipment. These indexes provide the information necessary to determine whether your activity's technical files are current and contain the required material.

However, during the period between issues of indexes some tech pubs are issued with little or no indication of their existence. You should have Aeronautical Publications and Forms Order Blank NavAer - 140 and Aeronautical Publications Requirements Request NavAer - 2126 available within your activity to order what material you need. Knowing *which* of these two order forms to use *when*, can prevent the non-receipt of the necessary technical information.

NavAer-140 is used only to order currently available publications and forms as the need arises. This form will *not* result in automatic distribution of any revisions or reissue of the material requested.

NavAer-2126 is used to request automatic distribution of new publications, revisions and reissues. Your completed NavAer-2126 form should be forwarded to:

Officer-in-Charge
U.S. Naval Air Publications Facility
700 Robbins Avenue
Philadelphia 11, Pennsylvania

To insure automatic distribution, each September you should submit a current publications requirement request using form NavAer-2126. You can modify this request between annual submissions on an additional form NavAer-2126. But, only those items for which requirements are being added or changed need be shown. Be sure to mark this form "Modification" before mailing it.

If yours should happen to be a new outfit, your initial outfitting of Aero Pubs will be based on your mission and Section "K" Allowance List. These are distributed at the time of activation. Now, it's possible this commissioning allowance may not include all publications desired by your activity and it's expected that you will request the items required. As soon as possible, after commissioning, therefore, both forms NavAer-140 and NavAer-2126 should be submitted.

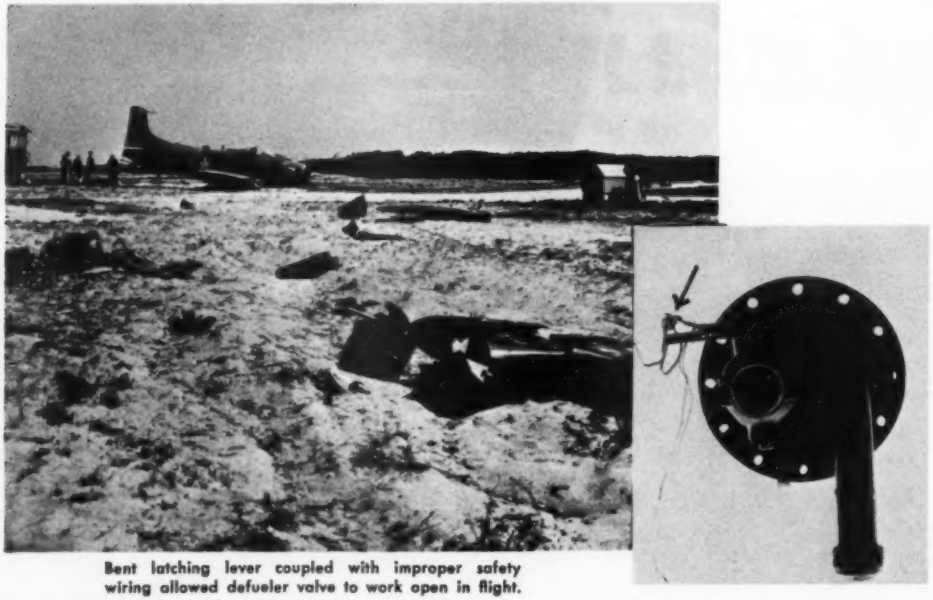
If your outfit should receive a marked change in its mission so that a completely new or different set of Aero Pubs are required, a letter request should be sent to the Officer-in-Charge, Naval Air Publications Facility stating the new requirements. Your commissioning allowance will be provided therefrom.

Getting this technical information from the source to those who need to know, is a task that requires continuous attention. So, survey your publications requirements continuously. The coordination and forwarding of requests, the receipt and routing of incoming publications, and the supervision of libraries of technical information are proper functions to be accomplished in connection with this assignment.

Administration errors can be kept at zero by insuring that all Aeronautical Publications get to the man *who needs to know*. ●

From the Ground Up

Notes and Comments on Maintenance



Bent latching lever coupled with improper safety wiring allowed defueler valve to work open in flight.

WORKING BY 'FEEL'—An attack squadron with AD-4Bs which did not usually operate with external 300-gallon fuel tank on the center line rack, had been so equipped due to certain operational commitments.

Line maintenance personnel of the squadron were aware of the difficulty involved when draining the low point defueling valve on the main fuel cell when the 300-gallon tank was hung on the center line. Access to the defueling valve is in very close quarters and all work has to be done more or less by "feel."

The plane captain of one of the ADs was aware of a bent defueling valve lever on his plane but he safety wired the lever in such a way that he thought it would not be able to work loose. However, he inadvertently wired it so that it would tend to work open rather than stay closed.

The plane was scheduled for a cross-country and the pilot made a visual check of fuel and oil aboard. During the first hours of the flight, fuel from the external tank was used. Not desiring to run the external tank completely dry, the pilot switched to main internal fuel after about 3 plus 30. Seconds later the fuel pressure dropped and the engine began cutting out. He switched back to external and banked toward an Air Force base a few miles to the side.

Nearly to the field the engine quit completely and a switch to the internal tank with an attempt to regain fuel pressure produced no results. The aircraft was too low and it struck the ground, gear trailing, 118 yards short of the runway, sliding to within 20 yards of the approach end.

A check of all fuel tanks showed them to be completely empty. The low point drain handle was approximately one-half open and the un-

derside of the aircraft showed signs of fuel leakage.

An inspection of the defueler valve showed that the latching lever had been bent outward to such an extent that the compression spring had fallen out and when the lever was safetied, the locking pin had dropped from the proper position allowing the valve to work to the partially open position.

HOME TEAM—One recommendation to ease the spectre of jet fuel in a reciprocating-engined aircraft comes from Norton Air Force Base, California.

Familiarize all crew members of the dangers of wrong fuel, says Norton, and then when away from home station have at least one qualified crew member remain at the aircraft to observe or supervise the refueling.

FOULED OUT—An S2F was loaned to a carrier for handling exercises. A rudder tip of the aircraft was damaged during handling when the rudder failed to clear a basketball net.

Cause of the accident was attributed to inattention on the part of directors. Directors of the preceding plane sighted the obstruction but failed to warn the directors of the S2F. The basketball net was improperly secured to the overhead.

OIL—Recent reports indicate improper maintenance of the engine lubrication system. This situation has resulted in many premature engine removals, accidents and forced landings.

Here are some of the discrepancies and remedies:

Bearing Failures—Many of these are attributed to momentary oil starvation due to lack of pre-oiling. Engines that remain idle in excess of 72 hours should be pre-oiled (see the Handbook of Service Instructions).

Clogged Strainers and Excessively Sludged Engines—Technical Order No. 37–54 permits operating activities to establish oil change intervals to prevent excessive sludging if the latter decreases engine reliability. Engines equipped with disc type strainers should have the strainers cleaned thoroughly at each periodic maintenance inspection. This can be done only by disassembling the strainer and soaking in solvent (see the Handbook of Service Instructions).

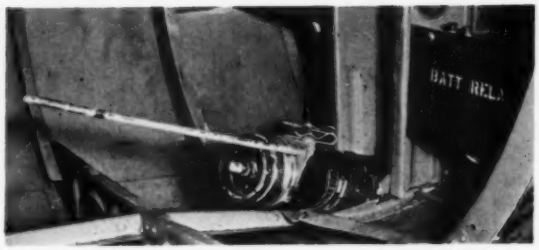
BATTERY SHOP VENTILATION—An electrician servicing a battery charging bench received injuries (lacerations and burns) from battery casing fragments and sulphuric acid when a battery blew up in the shop. The explosion was caused by inadequate venting of gases generated by lead-acid aircraft batteries undergoing normal charge.

Certain features of the shop's specifications had not been incorporated during construction, in the interest of economy. These included the hood vent assemblies for carrying away gases generated during the battery charging cycle.

A battery vented its "ire" in a closed shop.

To prevent a recurrence, only one-third of the shop's battery charging facilities were used.

Provisions were later made to complete a change of air in the shop every two and one-third minutes. This is considered more than adequate to vent a battery charging room.



The tailwheel collapsed when bolts too short to reach locking feature of elastic stopnuts worked off.

THE WRONG BITE—After the tailwheel oleo strut assembly of an HUP-2 collapsed during an otherwise normal landing, inspectors discovered that the elastic stopnuts were missing from the strut retaining bolts.

The accident board noted that Service Change 80, which includes changing these bolts from a head-up to a head-down position, had not been accomplished. An effective date had been assigned this change.

Installation of new nuts on the bolts revealed that the locking feature of the nuts could not engage the threads of the bolts. The bolts had been shortened (See photos above). The nuts had backed off during flight permitting the tailwheel oleo strut to drop out of place and fail on landing.

Had the correct bolts and nuts been installed the accident may have been prevented. Furthermore, said the accident board, it is unlikely that both nuts backed off at the same time. Therefore, this was considered to be progressive failure which might have been discovered prior to flight had preflight and periodic inspections been more thorough. Besides closer inspections, the board recommended that S.C. 80 be completed as soon as practicable, but not later than the next periodic check.

For more details concerning elastic stopnut usage see "Right Bite," May *Approach*.

UNLOCKED NUT—The nosewheel doors failed to open and the nosewheel would not extend when the pilots of an S2F-1 attempted to lower the gear for landing. The tower was informed of the unsafe indication, and the aircraft was instructed to circle the field. After all known emergency procedures were used to no avail, the copilot was told by radio to cut through the cabin floor and try to push the nosewheel doors open with the handle for the emergency hydraulic pump. This too was unsuccessful although a dozen holes were punctured through the decking.

The cause of the failure was the shearing of the terminal rod end from the nosewheel door actuating cylinder. The *cause of the shearing* was that the terminal rod lock nut was tightened against the limits of the threads and not against the end of the actuating rod, as it should have been. This maintenance personnel error produced high overstress from a one-way bending load and precipitated a fatigue failure.

The S2F was finally landed with the nosewheel still retracted, and thanks to some very fine pilot techniques, only minimum damage was incurred.

LAUNCH WITH MASKS—Immediately after being catapulted, gasoline fumes were noticed in the cockpit of an AJ-2. The fumes intensified rapidly and each crewmember opened his respective canopy in an attempt to vent the cockpit.

The strong fumes started to overcome all three crewmembers and the third crewman was unable to get his oxygen mask on before he passed out. The bombardier was able to rig his mask for use but couldn't turn on the oxygen before he lapsed into semiconsciousness.

Leveling off at 1000 feet, the plane commander was unable to reach his mask and tried without success to get one of the other crewmembers to hand it to him. About this time he only remembers trying to stay awake by keeping his face in the air stream. He also remembers that heading and altitude varied continually with the altitude between 500 and 2000 feet.

After an estimated 20 minutes the fumes subsided and all three crewmembers revived enough to don their oxygen masks and resume control of the aircraft. The plane commander and bombardier turned to 100 percent. The third crewman remained on NORMAL oxygen —and, shortly afterward, passed out again.

Upon landing at the nearest air station the third crewman regained consciousness after about 45 minutes. The flight surgeon at the station reported all three crewmembers had suffered from hypoxia caused by oxygen being cut off from their lungs by the intense fuel fumes.

The gas cap for the combat fuel tank was found lying loose between the tank and fuselage skin inspection plate. Fuel had overflowed into the bomb bay and the fumes passed into the cockpit through an unsealed bomb-bay access door. After the initial launch, the maneuvering of the plane caused a continued overflow of gas until enough was lost to stop the leakage.

It was recommended that oxygen masks be worn by all crewmembers on all carrier launches until such time, after becoming airborne, it appears that all equipment is operating normally.

Murphy's Law

* If an aircraft part can be installed incorrectly, someone will install it that way.

MURPHY IN J65 ENGINE FUEL CONTROL

The pilot of an A4D-1 was at 1000 feet when an unknown pilot of another aircraft in the air broadcast that flames were visible around the aft section of the A4D's fuselage. The A4D pilot promptly shut down the engine and executed a landing on an airfield.

A Murphy factor in the Model TJ-L2 fuel control of the aircraft's J65 engine was determined to have caused this in-flight fire. The O-ring seal, part number R33-P-1550-3232, was put against the cover face instead of in the machined groove located ¼-inch from the inner end of the cap for the packing O-ring.

Several in-flight fires have resulted when this O-ring seal was installed wrong in the J-65 engine fuel control.

Cases of in-flight fires involving this Murphy have also been reported in J-65-equipped FJ-3 and -4 model aircraft. (Note: F11F aircraft are also equipped with this model engine.)

It was recommended each time the fuel filter is removed, that an inspection be made to insure that the filter O-ring is installed correctly; after installation and prior to engine run-up, inspect for fuel leaks with system under pressure of the aircraft fuel boost pump and if satisfactory, with engine RPM at least at IDLE.

the Tip-tank

Miscellaneous aviation safety information

RIGGING EMERGENCY RUNWAY ARRESTING GEAR

BuAer has issued information concerning optimum rigging of emergency runway arresting gear for all fields including maximum pendant height.

Complete and current specifications are contained in Emergency Runway Arresting Gear Bulletin No. 5.

The newly issued bulletin supersedes bulletins 1 through 4.

GOOD NEWS

A CAA program to improve airport surveillance radar performance during rain and snow storms is to be carried out at 47 civil airports.

The improvement is "circular polarization" which permits a clearer return of aircraft on the radar screen. Of the 47 units to be modified the one at LaGuardia is already complete with five others, at Idlewild, Newark, Boston, Washington and O'Hare, to be completed by the end of the year.

Among locations *scheduled for* circular polarization of ASR equipment are: Atlanta, Denver, Los Angeles, Birmingham, Columbus, Dallas, Detroit (Willow Run), Jacksonville, Kansas City, Memphis, Minneapolis, New Orleans (Moisant), Norfolk, Oakland, Philadelphia, Seattle and St. Louis.

With few exceptions, Navy precision radar gear (GCA) has been modified with circular polarization. Navy surveillance radars are equipped with moving target indicators which decreases the effects of precipitation on radar returns.

AVIATORS' FIRST AID KITS

An individual first aid kit which contains enough emergency equipment for a pilot to take reasonable care of himself is available for issue to all pilots. It can be found in the Armed Services Medical Stock List as Stock No. 6545-919-7675.

GO, GO, GO!

Instructions for manning GCA units contained in OpNav Inst. 3721.1A are minimum requirements. Operations duty officers should alert the GCA crews any time there is a question that the field will go IFR and there is inbound traffic. This is especially a requirement while operating jets with their critical fuel consumption.

THE SILENT TREATMENT

As a footnote to the story "Noise That Annoys" (October 1956 *Approach*), the Office of Naval Research in Washington, D. C. has announced a new training film on the defense against high intensity noise. It is completed and distributed to district training aids libraries, aviation libraries and Marine Corps film libraries.

Men working around jets on ramps and carrier decks must have some understanding of the effects of high noise levels and the advantages of protection devices. This 20-minute sound film covers these topics in addition to showing the various protection devices.

Print number is MN-9318c—Medical Aspects of High Intensity Noise; ear defense.

COLLISION PREVENTION

Chief of Naval Operations has approved the painting of combat aircraft with a high visibility color scheme while in training in high density areas of the continental United States or its possessions. Type commanders have the option of authorizing this new paint scheme, consistent with their safety needs.

The international orange is a temporary type paint job and the "grey ghost" look is to be restored prior to overseas deployment. An exception will be where the trip is purely a training flight and the international orange paint may be retained. (Reference is CNO letter serial 29P551 of 19 July 1956 to BuAer.)

BuAer's letter Aer-MA-354/93, of 15 August 1956, addressed to ASO, Philadelphia, provides instructions for procurement of paint to expedite this modification, which is intended to "approximate within practical limits the effect of the International Orange and White high visibility color scheme on combat aircraft."

IT'S COMING

Distribution of training film (MN-8270 "Aircraft Accident Investigation") was scheduled for September according to BuAer. Initially there will be 80 to 90 copies printed and distributed to Naval Photographic Centers throughout the world.

NEW GIMMICK

Headquarters Aircraft Fleet Marine Force, Atlantic has passed on to 2d Marine Wing and Marine Air Group 31 a description of a wheels-up warning device for use on SNB aircraft.

Authorized by BuAer for SNBs within AirFMFLant, the warning system incorporates a warning light connected in parallel with the present warning horn. A small flasher unit is placed in series with the light so that the light flashes to attract attention when an unsafe gear condition exists.

OLD PRO CLUB

Joseph Otto Lynch, Major, USMC
F4D-1, VMF 115

Experiencing a very high altitude flameout in an F4D-1, Major Lynch established a glide for an air station 30 miles away, and attempted air starts en route which were unsuccessful. Arriving over the field at 10,000 feet, Major Lynch landed on the 8000-foot runway, engaging the arresting gear with no damage to the airplane.

James L. Keyes, NavCad
Aircraft: T-34B; BTU-1S, Whiting Field

On his first solo flight in a T-34B, Cadet Keyes experienced an engine overspeeding which threw the propeller off the aircraft. With power gone, canopy covered by oil, radio failure and partial electrical failure, he performed emergency procedures for lowering the landing gear and landed without further damage to the aircraft.

Harry J. Hites, Lt.(jg.), USNR
Aircraft: F2H-3, VF-52

Due to mechanical failure, Lt.(jg.) Hites was unable to lower the nosewheel of his F2H-3. He entered the landing pattern of his carrier and made a normal mirror approach. The landing was smooth and the tailhook engaged a cross-deck pendant. Lt.(jg.) Hite maintained 95 percent power on and was able to keep the aircraft taut against the arresting wire with the nose clear of the deck until flight deck personnel could support the nose and lower it onto a dolly. The aircraft sustained no damage.

John MacGregor, Lt., USN
Aircraft: P2V-5, VP 57

While making a rocket run, a SCAR exploded on the wing rack, putting shrapnel holes in the main oil line to the port engine. Gas fumes immediately filled the aircraft. Lt. MacGregor feathered the engine and had all electrical gear secured. He then proceeded to the air station where he made a successful single-engine landing.

Recognition of heads-up flying is essential to a positive program of flight safety. Each month, Approach will acknowledge certain selected individuals whose exhibited flying ability merits membership. Old Pro's also receive a wallet membership card as a memento of the occasion. Commanding officers are invited to submit nominations for selection.

***Approach* is recognizing those persons, who in the proper performance of their duties, prevent wheels-up landings. Commands with knowledge of "saves" by their personnel are requested to submit a speedletter report of the incident. See page 40 October 1956 *Approach* for details.**

LAWS, E. H., AC2 HANKEL, M. J., DC2

NAS NEW ORLEANS, 10 July 1956

The pilot of an SNB reported "base leg, wheels down-and-locked." A visual check of the landing gear by Control Tower Operator **Laws** determined that the gear was not down, and he ordered a waveoff by radio and Aldis lamp. Simultaneously, Runway Wheel Watch **Hankel** observed the wheels-up approach and fired a flare well ahead of the aircraft. The pilot was on final before initiating the waveoff.

STOLLBRINK, R., AC1 NELSON, P., ACAN CAREY, E. J., SN

NAS FLOYD BENNETT, 25 July 1956

An SNJ pilot on base reported gear down and locked. **Stollbrink** and **Nelson** in the control tower and **Carey** at the end of the runway alertly observed the gear was not down when the aircraft turned into final. From their respective positions, they issued waveoff instructions by radio and with paddles, thereby preventing the wheels-up landing.

MAJOR J. G. HARRINGTON CASBERG, R. E., AN

NAS SPOKANE, 3 August 1956

The pilot of an F9F-6 entered the traffic pattern, broke and put the wheels down. The tower ordered all planes in the pattern to take waveoffs while aircraft were taking off, so the pilot pulled the wheels up. Shortly thereafter, he saw the last of the aircraft for takeoff rolling, so he lowered the wheels a second time. He then observed other planes in the landing pattern orbiting with their wheels up, so again he picked up his gear. At this time, the tower called and cleared planes to land. Being in position at the 180-degree spot, he commenced his approach—wheels up! Runway Watch Officer, Major **Harrington,** by means of portable radio, and Runway Watch **Casberg,** utilizing paddles, gave the waveoff in time to prevent a wheels-up landing.

KOTHE, O. , AD2 BLAUHAUS, R. J., AB3

NAS FLOYD BENNETT, 4 July 1956

A wheels-up landing in an F9F-7 was prevented by Control Tower Operators **Kothe** and **Blauhaus** when they observed the aircraft turning into final with the gear up, although the pilot made the standard voice report, "Turning base, gear down and locked." Waveoff instructions were issued by radio.